HELSINGIN KAUPPAKORKEAKOULU



Markkinoinnin koulutusohjelma


# IMPACT OF FORM POSTPONEMENT ON CHANNEL MEMBERS' PERFORMANCE IN PAINT BUSINESS IN EASTERN AND SOUTHEASTERN ASIA



Liiketaloustiede: markkinoinnin
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**Liiketaloustiede: markkinoinnin**
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# TUOTTEEN ERILAISTAMISEN VIIVÄSTYTTÄMISEN (FORM POSTPONEMENT) VAIKUTUKSET JAKELUKANAVAN JÄSENTEN SUORITUKSEEN MAALITOIMIALALLLA ITÄ- JA KAAKKOIS- AASIASSA

**Tutkimuksen tavoitteet:**

Tutkimuksen tavoitteena oli selvittää, mitä vaikutuksia kokoonpanon ja tuotannon viivästyttämisellä (assembly and manufacturing postponement) on jakelukanavan jäsenten suorituksiin maalitoimialalla Itä- ja Kaakkois-Aasiassa. Tavoitteeseen pyrittiin muodostamalla normatiivinen teoreettinen viitekehys. Sen perusteeella tutkielman empiirisessä osassa etsittiin sopivaa sävytysjärjestelmätoimittajan konevaihtoehtojen ja jakelukanavan tasojen (tukku tai vähittäiskauppataso) yhdistelmää.

**Lähdeaineisto:**

Tutkielman teoriaosa perustuu aikaisempiin lähinnä massaräätälöintiä ja tuotteen erilaistamisen viivästyttämistä käsittelevään keskusteluun, maalikaupan sävytysjärjestelmiä koskevaan ammattikirjallisuuteen, asiantuntijahaastatteluihin sekä Aasiassa aiemmin tehtyihin markkinatutkimuksiin. Empiirinen osa perustuu järjestelmätoimittajan luona suoritettuihin haastatteluihin sekä kuudessa Itä- ja Kaakkois-Aasian maassa tehtyihin haastatteluihin. Kohdeyrityksissä Aasiassa haastatteluja tehtiin yhteensä 31 kappaletta.

**Tutkimusmenetelmä:**

Tutkimusote oli kvalitatiivinen. Tutkielman teoriaosassa teoreettinen viitekehysmalli rakennettiin aikaisempien tieteellisten keskustelujen pohjalta. Empiirinen aineisto koottiin teemahaastatteluilla kuuden eri haastattelijan toimesta, kirjoittajan ollessa yksi heistä.

**Tulokset:**

Tutkielman teoriaosassa tehtiin ero tuotannonviivästyttämisen ja kokoonpanoviivästyttämisen välille. Tuotannon viivästyttämisen todettiin olevan vain tietyissä erikoisolosuhteissa kannattavaa. Toisaalta, tulokset osoittavat että kokoonpanoviivästyttäminen erityisesti tukkutasolla voi parantaa jakelukanavan jäsenten suorituskykyä.

Aasian maiden talouskriisi on vaikeuttanut erityisesti pienten kauppojen rahoitustilannetta, ja siksi ne eivät ole ainakaan lyhyellä aikavälillä kykeneviä hankkimaan järjestelmiä. Myöskin arvioitu mahdollisuus vain pienen lisähinnan saamiseen massaräätälöinnin eduista puoltaa viivästyttämistä tukkutasolla ainakin ensi vaiheessa.

**Avainsanat:**

kokoonpanon viivästyttäminen (assembly postponement), tuotannon viivästyttäminen (manufacturing postponement), massaräätälöinti, aikaperusteinen kilpailu, jakelukanavan suorituskyky (performance), sävytysjärjestelmät

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**Master's thesis**
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**ABSTRACT**

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# IMPACT OF FORM POSTPONEMENT ON CHANNEL MEMBER'S PERFORMANCE IN PAINT BUSINESS IN EASTERN AND SOUTHEASTERN ASIA

**Objectives:**

The objective of the Study was to find out the impacts of manufacturing and assembly postponement on channel members' performance in the paint business in Eastern and Southeastern Asia. A normative theoretical framework was built for that purpose. Based on it, the combinations of postponement levels (retail and wholesale) and postponement types were analyzed.

**Sources:**

The theoretical part included literature on mass customization and form postponement, professional articles on colour processing systems, market surveys performed in Asia, and specialist interviews. The empirical part was based on interviews by the system supplier and interviews in six Asian countries in 31 companies.

**Methodology:**

The research was qualitative. In the theoretical part, the theoretical framework was built based on former theoretical discussions. The empirical part was collected in target countries based on the theme interviews by six interviewers, the author being one of them.

**Results:**

In the theoretical part, the difference between manufacturing and assembly postponement was made. The results suggested that manufacturing postponement is a profitable solution only under certain conditions. On the other hand, there is a demand for assembly postponement at the wholesale level in the short term.

The difficult financial situation in Asian countries has caused difficulties especially to small retailers, and thus they are not capable of acquiring the systems at least in the short term. Also the estimated reluctance to pay additional price for the benefits of mass customization favors postponement at the wholesale level.

**Key words:**

Assembly postponement, manufacturing postponement, mass customization, time-based competition, channel performance, colour processing systems

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# 1. Introduction

In recent years, increased product variety and service requirements with increased competition have led manufacturers to find new product and process redesigns (Lee & Tang 1997). The focus of this study is on form postponement.

Bowersox (e.g. 1978, 1988, 1989) and Lee (e.g. 1992, 1993, 1997) have been the main authors in postponement discussion. However, the concept of postponement was first introduced in marketing literature by Alderson (1950, cited by Lee 1994) and after him e.g. Cox and Goodman (1956) have continued the discussion with applications of housebuilding materials. In Finland, among others Inkiläinen (1996) has studied postponement.

Nevertheless, there is little research which addresses the influence of different postponement types to channel members' performance. The focus of postponement discussion has been on logistical issues, and marketing values have not been taken into account. Paint business in Eastern and Southeastern Asia is a facinating research area because of two reasons. First, it is of interest to compare different channel structures and their impact on postponement implementation in this area because of its many special features. Second, penetration rate in Asia is very low compared to Europe and North-America, and thus a great deal of market potential exists.

The Study has an industrial system supplier's point of view. Using Hunt's (1983, 10) three dichotomies model of marketing, this study is normative, concerns the profit sector and has a micro approach. The primary research question is: What is the impact of different form postponement types on channel members' performance in paint business. The secondary questions are:

- What are the different form postponement types and which of them can be implemented in paint business?
- How form postponement influences channel members' performance?
- What are the distribution practices in Eastern and Southeastern Asia?

The case study method was employed in the empirical part. The empirical study was performed in cooperation with the Finnish company Tikkurila CPS Oy, which is the world

market leader as a supplier of advanced tinting systems which represent postponement solutions in paint business (see Bowersox 1978, 281). Furthermore, the empirical study was performed in six countries in cooperation with the Finnish Trade Center and sales agents of Tikkurila CPS Oy. The author made himself the interviews in Thailand.

The author has worked in Tikkurila Oy for four summers in different occupations, which has given him an insight both into the company and paint business in general.

## 1.1 Key Concepts

The criteria for choosing the following sources in determining the key concepts are that the sources represent high level academic writing and that the basic ideas are illustrated briefly. The other concepts are explained later in the context.

**Channel performance (Shipley et al 1991):**

Effectiveness in meeting customer needs.

**Time-based competition (Handfield 1993):**

Time-based competition refers to the ability to deliver a customized product within a shorter elapsed time than can competitors in the same market, and is usually measured in terms of delivery lead time.

**Mass customization (Cravens 1994, 213):**

Mass customization is the capability to produce customized products while achieving the cost benefits of mass production.

**Form postponement (Garg & Lee 1997,1):**

The strategy of delaying product differentiation until as late as is cost-effective.

This study concentrates on form postponement. Thus, another postponement mode, time postponement, is excluded. Postponement in this study means in all contexts only form postponement. The author argues that the definition for form postponement above is not perfect and thus another one will be defined in Chapter 3.2. In this Study, distributors include both retailers and wholesalers.

## 1.2 Limitations

This study focuses on distribution channels in six Asian countries. International channel flows, e.g. between Tikkurila CPS in Finland and a Malaysian paint manufacturer, are excluded in this study.

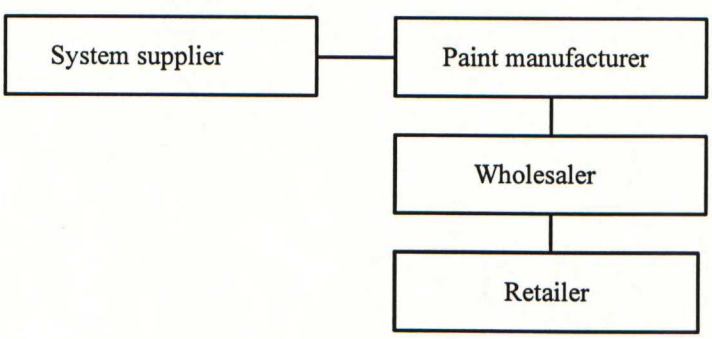
The interviews for both the theoretical and empirical parts were performed in Tikkurila CPS Oy. Hence, the view can be considered narrow but cooperation with many companies would be impractical because of two reasons. To begin with, Tikkurila CPS is the only supplier in this field in Finland. Moreover, in cooperation with several suppliers many interesting topics could be categorized as business secrets.

There is not very much literature on distribution channels of paint in Eastern and Southeastern Asia. Thus, in Chapter 5 it is assumed that general channel descriptions of these countries also represent their paint business. The purpose of the empirical study was to find the real situation in paint business.

## 1.3 Industrial System Suppliers' Point of View

As mentioned, the subject of the study is postponement solutions in distribution channels. In paint business these solutions are often developed by an outside system supplier which sells systems through paint manufacturers to distributors, as Figure 1.1 shows.

Figure 1.1: Position of system supplier




Source: Aulanko, interviews

As the deals are made between two business units, reerence is made to industrial marketing. Special features in industrial marketing include the following: industrial marketer's promotional mix emphasizes personal selling rather than advertising, the industrial marketer's product offer includes an important service component, and price negotiation is frequently an important part of the industrial buying/selling process. (Hutt & Speh 1981, 8) One major point in industrial marketing is also the identification of customer needs, which requires an understanding of the economies of the customer's operations, the structure of the industry within which they operate, and how they compete (Webster 1984, 13-15; see Rajala & Möller 1994, 28-30). An organizational buyer is not usually the end user of the product. Instead, he buys the product for use in the manufacturing process, to maintain the business or for reselling to other customers. In addition, the quantities involved in organizational purchases can be enormous. (Wilkie 1994, 595-598; see Webster & Wind 1972, 2)

This study concentrates on system marketing as a form of industrial marketing. The basic idea in system marketing is to offer integrated solutions to complex customer problems and thus requires a proper definition of the customer's technical problem. A useful classification consists of the following groups: product systems, systems contracting, and service systems. The study focuses on product systems, because that is the case in form postponement systems. Product system is composed of capital goods and consumable supplies that are used up in the operation of the capital equipment. Consumables are repeat-purchase products that generate ongoing sales. (Page & Siemplenski 1983; see Paija 1993, 85-88)

The marketed system can be divided into hardware and software components that in principle could also be marketed separately. Software consists of know-how, operating systems, and standardized application programs. Hardware consists of the physical or tangible equipment available to the system. The importance of software components has grown and it is claimed that system support services often represent the key decision criteria in supplier selection (Page & Siemplenski 1983). A reason for concentrating more on software components is that it is becoming increasingly difficult to create or sustain competitive superiority in hardware only (Simon 1992).

In system marketing the know-how, which to some extent already exists in the firm, can be commercialized and packaged (Paliwoda & Bonaccorsi 1993). System marketing creates the potential for synergistic effects. For instance, the standardized hardware and software components allow the supplier to achieve the benefits of mass production methods in the factory while being able to provide each customer a unique system configuration. For the customer, these effects normally mean a quick system implemention and reduced development costs. (Page & Siemplenski 1983; Kosonen 1991, 41)

System marketing creates loyalty between the system supplier and the user. Design compatability alone creates a barrier to the introduction of foreign components into a system. Once a system is installed, competitive replacement is often so costly, that it is unlikely to occur as long as the system continues to meet the user's needs, a significant technological breakthrough is not made by competitor, and the supplier supports the installation to the satisfaction of the user. This is the main reason why market share and installed user base become so important in systems marketing. As user needs grow, the growth of system revenues accrue to the original vendor. This type of growth with the customers is the ultimate goal of marketing for it provides the opportunity for better control over the customer, marketplace and price of the system. (Page & Siemplenski 1983)

In paint business, the system means a shift to a tight relationship between the system supplier, the manufacturer and distributors using the system. One of the formal documents is the secrecy agreement which is signed by the participants. (Aulanko, interviews)

# 2. Distribution Channels

The purpose of this chapter is to describe the distribution channels both at the general level and in paint business. In addition, different channel relationships and physical distribution practices are discussed. In the end, the focus is on performance measurement in distribution channels. This chapter analyzes distribution channels from a system supplier's point of view. It follows that the present channel structure is preserved.

## 2.1 Channel Structure

Channel structure refers to the manner in which the sale of some commodity is organized by the firms engaged in trading in it. The number and size of the firms, size of distribution, range of products handled, number and type of functions performed, and number of establishments owned by each firm describe the channel structure. (Bucklin 1972, 66).

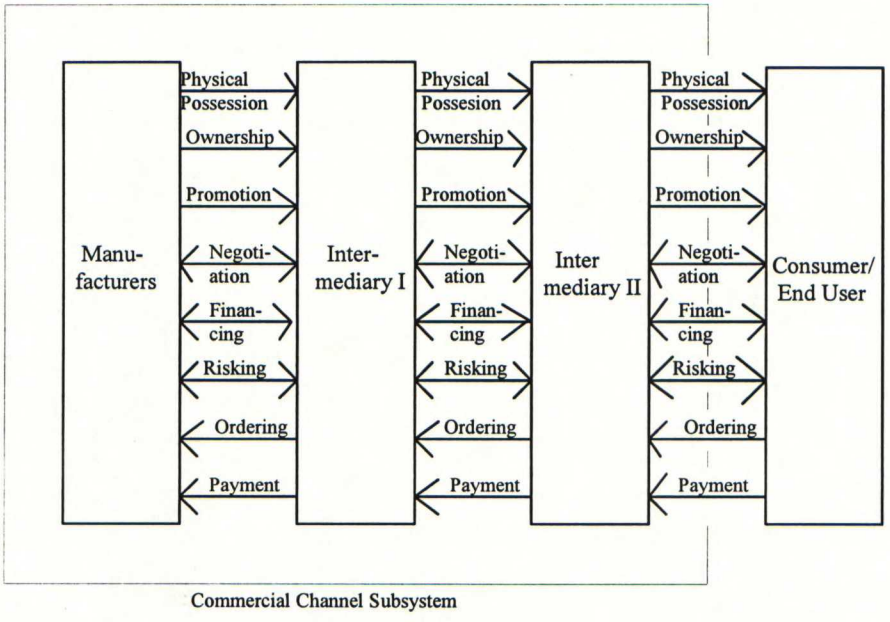
There are many factors which determine the channel structure. According to Stern and El-Ansary (1988, 25), geography, size of a market area, location of product centers, and concentration of population, among other physical factors, play important roles in determining the structure of channels. Distribution channels tend to be longer when production is concentrated and markets are dispersed. In addition, laws can influence the channel structure.

The link between channel output and channel structure is determined by Bucklin (1972, 18-31). He has specified four service outputs: spatial convenience (or market decentralization), lot size, waiting or delivery time, and product variety. These service outputs are achieved through the performance of flows. The channel structure should be capable of satisfying the needs of both channel members and consumers. The more service outputs are required by consumers, the more likely it is that intermediaries are included in the channel structure. Channels can also be organized differently to reach similar or different market segments. (Stern & El-Ansary 1988, 19-31)

Flows are widely-used to describe connections between channel members. According to Bucklin (1970, 17-18) flows are "the movement of some element of the transaction from the

point of production to the point of consumption". Figure 2.1 shows flows in channels. The focus of this study is on physical possession/product flow.

Figure 2.1: Flows in channels




Source: Gattorna & Walters 1996, 180

Three basic divisions of a marketing channel are manufacturers, intermediaries, and end-users. Intermediaries are further broken down into wholesale and retail intermediaries. The commercial channel by definition excludes final users, because final users are viewed as a target market. (Rosenbloom 1995, 34) This study concentrates on the commercial channel, thus excluding material suppliers and end-users. Next the intermediaries are discussed.

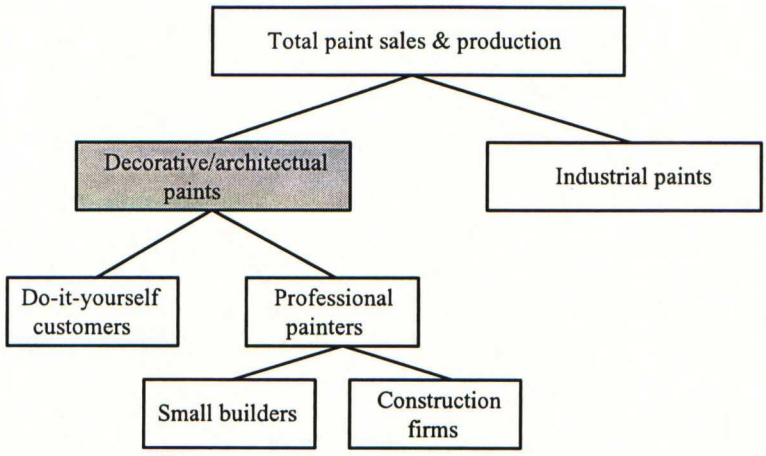
### 2.1.1 Retailers

Retailers' tasks include the following: advertising and display, dividing large quantities into consumer-sized lots, offering storage, and removing substantial risk from the producer/manufacturer by ordering and accepting delivery in advance of the season (Rosenbloom 1995, 74). However, this would seem to be a very manufacturer-orientated approach which has been changed in many fields due to the increasing size of retailers and retail chains' centralized buying (Grant 1987, 43; Hyvönen 1990, 2).

There are a few factors that may contribute to the survival of the smaller retailer in the long term. First, some independent retailers have formed voluntary buying groups. For instance, Väritukku is a buying group of independent hardware stores in Finland. Second, independent retailers may take over some of their own wholeselling functions by purchasing at trade cash-and-carry outlets. Finally, with regard to patterns of demand or custom, two features may promote the continuing survival of independent retailers. First, in those areas where corner shops offer a unique service by personal attention and opening hours, shopper demand may be fairly inelastic in response to the higher prices charged to cover greater unit costs (see Scheer 1996). Second, the independent retailer will survive, even in larger centres of population and in open competition with multiple-shop organisations, if a clearly differentiated product service combination is offered at a price that some proportion of the shopping public is willing and able to buy. (Howe 1992, 31-33)

Next a deeper insight into paint retailing is taken, concentrating on the architectual paint sector. The total architectual market consists of DIY (Do-It-Yourself) paint sales, sales to the house-painting professional trade, and sales to the construction sector (WPF 1996, 49-53). Large quantities to construction firms are often delivered direct from a paint manufacturer, and thus retailing does not play a major role in sales for this sector. Determination of a DIY store is not simple because the boarder line between sales for amateur and for professional use is difficult to determine. While the main customers of DIY stores are home handymen, also professional builders, decorators and other trademen often visit the same stores. (DIY 1996b) For instance, builders who work on grey markets are often reluctant to visit professional shops because they might see colleaguees there. They can avoid this risk by buying the paints from DIY stores. (Aulanko, interviews) In this study a DIY store is defined as a store mainly for amateur users. Based on the discussions, a division of paint sales is illustrated in Figure 2.2. In Europe, the division is estimated: DIY sales 33%, professionals 67%; in the USA 45% and 55% (WPF 1996, 53).

Figure 2.2: Division of paint sales




*DIY stores.* The dominant trend in DIY retailing has been the increasing number of the superstores. The power of the multiple superstore retailer is increasing worldwide as the larger, nationwide chains exercise their buying power at the expense of independents. The success of the superstore format has been under-pinned by consumer preferences for out-of-town, one-stop shopping linked with easy access, wide variety, and the competitive pricing that such DIY superstores offer. Table 2.1 shows that in addition to the superstores the hardware and other specialist DIY goods stores continue to account for significant shares. US retail sales of paint is marked both by the strength of the specialist paint stores and the diversity of non-specialist retailers involved in the market, including general mass discount stores, notably K-Mart and Wal-Mart and department stores. (WPF 1996, 53-55)

Table 2.1: DIY paint sales by outlet type 1995 (% by value)

| | USA | UK | Germany | France |
|---|---|---|---|---|
| Hardware/specialist stores | 43a | 15c | 40 | 10 |
| Home centres/DIY superstores | 22b | 70 | 50 | 55d |
| General retailers (hypermarkets, discount stores, department stores, other) | 33 | 5 | 10 | 35 |
| Total | 100 | 100 | 100 | 100 |

Note: a) includes paint stores c) excludes paint stores b) includes high street multiples d) includes wholesale

Source: DIY 1996a; WPF 1996, 55

*Professional stores.* Small professional stores are called mom & pop (papa & mama) shops, where the husband is the painter and the wife keeps a small shop. In these shops profit

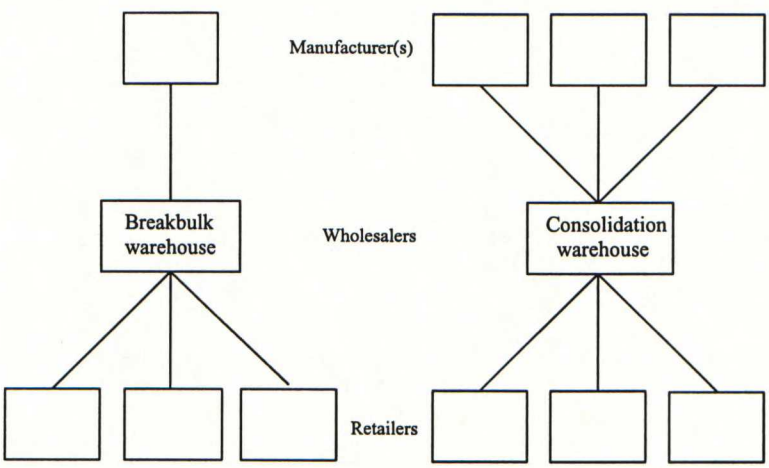
margins are higher than in DIY shops, because they can offer a good knowledge of paint products. (Gootjes, interviews)

### 2.1.2 Wholesalers

The concept of wholesale includes that the wholesaler should have more reselling than direct selling (Kotler et al 1996, 939). Sometimes wholesalers sell direct to heavy-users. Besides, large retailers may act as wholesalers by reselling to smaller retailers. (RJEV 1995, 14-16)

There are three types of wholesalers. *Merchant wholesalers* are firms engaged primarily in buying, taking title to, usually storing, and physically handling products in relatively large quantitities and then reselling the products in smaller quantities to retailers and to other wholesalers. Merchant wholesalers often provide credit control over small retailers. Figure 2.3 shows two warehousing methods of merchant wholesalers. Breakbulk warehouse, also called distribution center, receives large shipments from a manufacturer. On the other hand, in consolidation warehouse large shipments are made from a number of manufacturers to a central warehouse. (Lambert & Stock 1993, 265-266)

Figure 2.3: Breakbulk and consolidation wholesalers




Source: Lambert & Stock 1993, 265-266

*Agents, brokers and commission merchants* are independent middlemen who do not take title to the goods which they deal with, but who are actively involved in negotiatory functions of

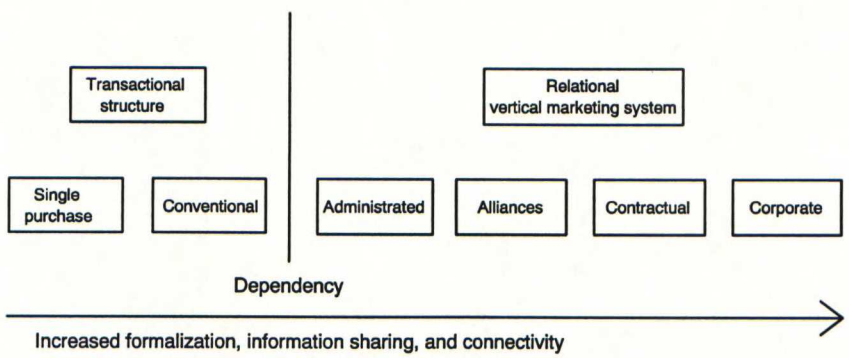
buying and selling while acting on behalf of their customers. They are usually compensated in the form of commissions on sales and purchases. *Manufacturer's sales branches and offices* are owned and operated by manufacturers but are physically separated from manufacturing plants. (Rosenbloom 1995, 40-52) The sales unit can also be located at the factory but then it is not a sales office, rather a sales department.

Wholesalers will exist in some industries as long as they perform their distribution functions more efficiently than other middlemen. However, the need for wholesalers appears lessened as large chains use centralized buying and often deal direct with manufacturers, thus cutting out the wholesaler. As retail categories are taken over by stronger, more professional chains, the role of many wholesalers is threatened. Nevertheless, there is a countervailing force at work. Retailing is becoming increasingly fragmented as more and more specialized retailers cater to specialized market niches. As this specialization occurs, using wholesalers becomes the most cost-efficient way for manufacturers to cover fragmented retailer market segments. (Magee et al 1985, 24-25; Hardy & Magrath 1988, 313)

## 2.2 Channel Relationships

Three channel relations are specified by Bowersox and Cooper (1992, 102), ranging from the least to most open acknowledgement of dependence: Single transaction channels, conventional channels, and vertical marketing systems. Figure 2.4 provides a graphical illustration of this categorization, which also works as a structure of this section. The reasons for vertical integration are summarized in Appendix 1.

Figure 2.4: Classification of channel relationships




Source: Bowersox & Cooper 1992, 102

*Single-transaction channels* result from transactions negotiated with the expectation that the business relationship will not be repetitive. Firms engaged in *conventional channels* acknowledge the benefits of specialization and focus their performance to a specific area of the overall channel. Participants in conventional channels, however, are not ready to become as fully committed members of a behavioral marketing system. (Bowersox & Cooper 1992, 102-103) In *administrated system*, coordination of marketing activities is achieved through programs developed by one or a limited number of firms. The locus of authority remains with the individual channel members. (Stern & El-Ansary 1988, 320)

*Alliances/partnerships* are a voluntary form of extended organizations not formalised by contractual arrangements. A true partnership orientation means trust, opening the books of financial and other company secrets to outsiders (Peters 1990). The purpose of entering into a partnership is to achieve objectives that otherwise could not be realized (Jap & Weitz 1996, 28). Because of retailer variness, manufacturers often have to take the lead in forming partnerships. In addition, smaller wholesalers may find it advantageous to team up with smaller manufacturers. (Lusch & Brown 1996) An interesting finding in Kanter's article (1994) is cultural differences. Compared to North American and European companies Asian companies are the most comfortable with the relationships, and therefore they are the most adapted to using and exploiting cultural and human aspects of the partnership.

*Contractual* systems occur when channel members desire to formalize their role obligations by employing legitimate power. Also franchise systems belong to contractual systems. *Corporate* systems exist when channel members are owned and operated by one organization. Corporate forward integration occurs frequently when a manufacturing firm decides to establish its distribution centers or/and wholesale outlets. Corporate backward integration occurs when retailers or wholesalers assume ownership of preceeding channel members. (Stern & El-Ansary 1988, 326-350)

For this study, the important channel relationship categories are single purchase, partnerships and corporate systems. Single purchase reflects a relationship of independent companies without any commitment. On the other hand, in a partnership the parties are ready for deep cooperation. Corporate systems are based on ownership, for instance a manufacturer has its

own retail stores, which means that each channel member's advantages do not have to be separately calculated, rather the total impact on the whole channel.

## 2.3 Physical Distribution

Based on Finnish studies, a factor that influences distribution solutions is the size of a manufacturer. Smaller manufacturers tend to favor direct deliveries to end-users more than big ones do because they have small shipments in relation to the size of wholesalers. Because of this wholesalers are mainly interested in large paint manufacturers. (RJEV 1995, 54) Next a few issues relevant to physical distribution are discussed, including inventory management, push/pull systems, and demand forecasting.

### Inventory Categories

Inventory represents the largest single investment in assets for most manufacturers, wholesalers, and retailers. Inventory carrying costs should include only those costs that vary with the quantity of inventory and that can be categorized into the following groups: capital costs, inventory service costs, storage space costs, and inventory risk costs. (Lambert & Stock 1993, 359-368) Furthermore, inventories can be categorized into the following types: cycle stock, in-transit inventories, safety/buffer stock, speculative stock, seasonal stock and dead stock. Safety/buffer stock is held in excess of cycle stock because of uncertainty in demand or lead time. (Lamber & Stock 1993, 403-407)

### Impact of Push and Pull Systems on Product Flow

In *push* approach the manufacturer focuses his attention on the distributor and uses many different approaches to sell-in more of its own products. Marketing tools include field sales force, advertising and special promotions. In *pull* approach the focus of attention is the customer, and the objective of the approach is to stimulate the level of demand so that the distributor is encouraged to stock the product. Marketing techniques used could include in addition to advertising the in-store promotions and exhibitions. The flow of materials remains the same in both push and pull, but however, the flow of scheduling information is quite

different. In pull scheduling customer demand provides the pressure throughout the process. (Northey & Southway 1993, 38-39; Christopher & McDonald 1995, 252) Using a pull system a firm will not produce a product unless specifically required. In contrast, a push system permits the production of any authorized product if the necessary parts are available. (Bowersox et al 1993)

**Difficulties in Demand Forecasting**

A typical approach to resolving marketing complexity is to rely on sophisticated forecasting techniques to predict the level of demand for each product at multiple delivery destinations, followed by anticipatory distribution in advance of actual customer demand. Moreover, to implement anticipatory physical distribution, demand must be forecasted for every brand, package size, and version in which product is offered. Detailed forecasts are required to build inventories at the right time and place to satisfy demand. (Zinn & Bowersox 1988) This approach is both anticipatory and speculative.

The speculation concept holds that changes in the form, and movement of goods to the forwarded inventories, should be made at the earliest possible time in the marketing process in order to reduce the costs of the marketing system (Bucklin 1965). Thus, the risk is shifted to or assumed by a channel institution rather than shifted away from it. Speculation makes cost reductions possible through economies of large-scale production runs, by elimination of frequent orders, which increase the cost of order processing and transportation, and by the reduction of stockouts and their attendant cost of consumer dissatisfaction and possible subsequent brand switching. An accurate sales forecast is essential in marketing channels dominated by speculation. Otherwise, the increase in the cost of carrying speculative inventories will outweigh cost-reduction benefits from long production runs and infrequent orders. (Stern & El-Ansary 1988, 21)

## 2.4 Performance Measurement in Distribution Channel

Performance measurement is an analysis of both effectiveness and efficiency. Effectiveness is defined as the extent to which goals are accomplished. Efficiency is the measure of how well

the resources expended are utilized. (Mentzer & Konrad 1991) According to Pirnes (1996, 12) effectiveness is influenced by information from the environment and by responsiveness with the environment, while efficiency is influenced by capital effects on the one hand, and by variable and fixed costs on the other hand. *Channel performance* is determined by effectiveness in meeting customer needs (Shipley et al 1991). Because this study concentrates on service-based measures, modern financial measures, direct product profitability (DPP) and activity-based costing (ABC), are summarized in Appendix 2.

Service-based measures are becoming more common (Murphy & Farris 1993). For instance the following issues can act as service measures: number of received complaints, number of lines out of stock, number of lines above/below minimum service level, and deliveries within specifications (Vaivio 1995, 87). In addition to conventional fill rate measures there are service measures that are not widely used. They include total order cycle time or total response time to an order, average backorder levels, and backorder profile, that is, backorders that are one week late, two weeks late, and so forth. (Lee & Billington 1992) One important measure of channel performance is responsiveness to special delivery requests (Livingstone 1992).

Lead time in orders must be viewed from the customer's perspective. In doing so, measures of lead time performance should include the interval from the time the customer orders the product to final delivery (Vonderembse & White 1991, 815). Taking actions to reduce uncertainty regarding the outcomes of the dealy have an impact on customers' evaluation of service. (Taylor 1994). In other words, if an immediate delivery were not possible, a standard delivery/waiting time should be guaranteed.

In out-of-stock situation there is no precise way of measuring its impact on profit. Instead it is possible to evaluate the propabilities of stock-exhaustion consequences, estimate the frequency at which each of these consequences is likely to occur and make a weighted judgement about the financial consequences (Christopher & McDonald 1995, 265). Figure 2.5 illustrates profit consequences of out-of-stocks. Lambert and Stock (1993, 119) underline that customers reactions to out-of-stock situations differ, sometimes they change to the next store, sometimes the are ready to wait.

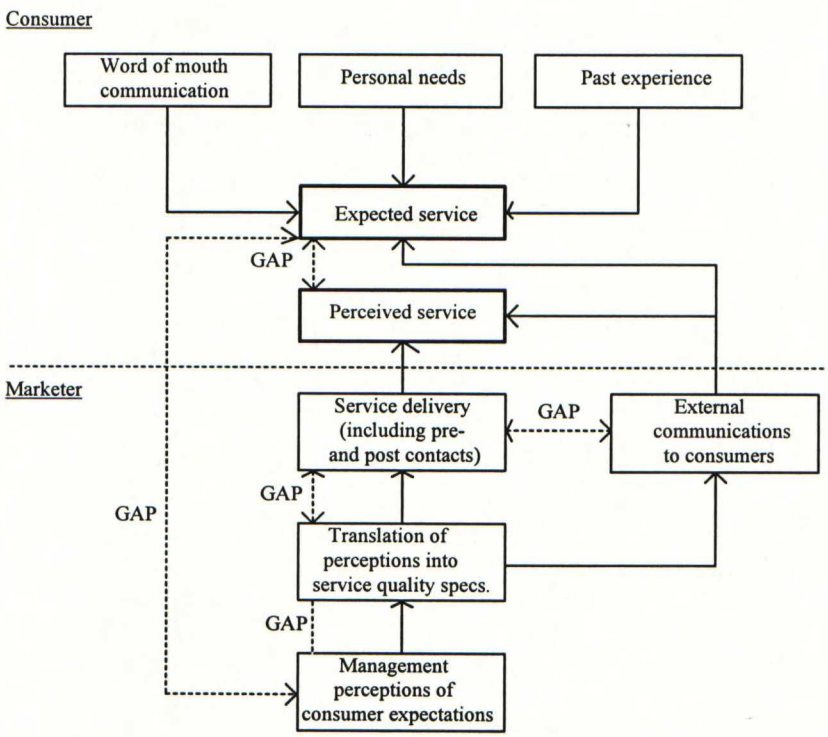
Figure 2.5: Profit consequences of a running out-of-stock

| *Consequence of service* | *Failure profit penalty* |
|---|---|
| - loss of sale to competitor | - gross margin of item |
| - customer re-ordering | - order-processing cost |
| - loss of sale in related items | - gross margin on all items |
| - shipment of goods from other depots | - expediting and transport cost |
| - expediting of rush orders at factory | - non-standard procedure cost |
| - customer's ill-will | - possible lost customer |

Source: Christopher & McDonald 1995, 265

The gap between expected and perceived service quality is illustrated in Figure 2.6. As the figure shows the service gap exits if there is a gap between perceived and expected service. On the other hand, expectations can be increased by the marketer's own communication.

Figure 2.6: Service quality model




Source: Parasuraman et al 1985

## 2.5 Summary

There were three main points in this chapter, First, the channel structure including both wholesalers and retailers were described. Second, three extreme forms of channel relationships (single purchase, partnership and ownership) were described. Third, the service-based performance measures in distribution channel were discussed. These three issues work as a basis for further discussions.

In addition, it was found out that speculative physical distribution often leads to problems in logistics and requires buffer stock and sophisticated demand forecasting methods. In the next chapter, a solution to this problem is discussed.

# 3. Impact of Form Postponement on Channel Members' Performance

Firstly, the relation of time-based competition and mass customization to postponement is discussed. However, the focus of the chapter is on form postponement and its impact on channel members' performance.

## 3.1 Market Trends which Utilize Form Postponement

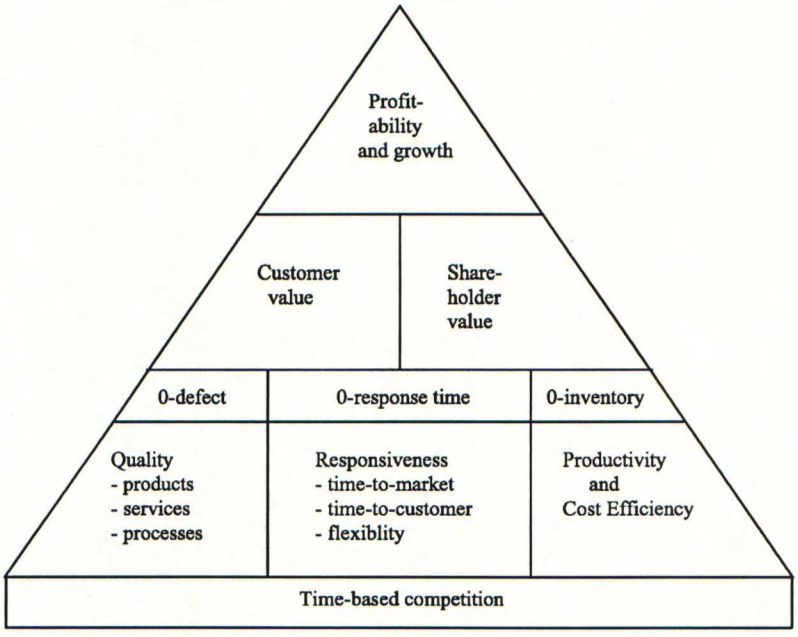
Both time-based competition introduced by Stalk (1988) and mass customization introduced by Davis (1987) use postponement as a tool to achieve a competitive advantage (see Persson 1995, Lee & Feitzinger 1997). However, postponement was already introduced in 1950. Time-based competition and mass customization reflect the market requirements under which postponement could be implemented and bring new aspects to the postponement discussion.

### 3.1.1 Time-Based Competition

Today's new generation competitors have an expanded pattern for corporate success. The traditional pattern was to provide the most value for the least cost. The expanded pattern is to provide the most value for the least cost *in the least elapsed amount of time*. These new generation competitors use flexible factories and operations to respond to their customers' needs rapidly by expanding variety. (Stalk & Hout 1990, 60; Spanner et al 1993)

A time-based competitor admits that it does not know in advance the customers' real needs (Pirnes 1998). The time-based competitor creates a competitive advantage based on three competencies. First, *time-to-market* is the ability to develop and introduce goods and services quicker than competitors. Second, *time-to-customer* is the capability to supply goods and services quicker than competitors. Third, *flexibility* means tailoring services more exactly according to customer needs than do competitors. (Persson 1995; see Schmenner 1988) The role of time-based competition in creating customer and shareholder value is illustrated in Figure 3.1.

Figure 3.1: Role of time-based competition




Source: Persson (1995)

As can be seen in Figure 3.1, flexibility creates responsiveness. Bolwjin and Kumpe (1990) define flexibility as "the ability needed to produce wide ranges of up-to-date products". The flexible manufacturers distinguish themselves from their competitors by shorter delivery times, with an increasing number of possibilities for ordering at shorter notice. Small batch sizes and fast response to customers' changing needs with integration and decentralization are the main themes of a flexible firm. (Bolwjin & Kumpe 1990)

A set of conditions under which firms are expected to increasingly invest in flexible manufacturing technologies include: declining costs of flexible manufacturing systems, increasing market segmentation and product differentation, products in the growth phase, and uncertainties regarding market size and customer tastes. (Tombak 1988, 2-7; Röller & Tombak 1989, 18)

Flexible and decentralized manufacturing offers many advantages. Transport costs can be reduced by moving source factories to market areas instead of optimizing long-distance transport methods. Distribution channels may be shortened and simplified, and better service with lower inventories could be offered. Maintaining flexible capacity capable of meeting demand during the peak season is a far superior method compared with mass production with

stocks in advance of the peak. When capacity can be varied to match demand, elimination of seasonal warehousing and inventory investment costs is the obvious result. (Harmon 1993, 80). Benetton as an example of flexible manufacturing is illustrated in Appendix 3.

### 3.1.2 Mass Customization

Another market trend behind the increased use of postponement is mass customization. It enables individual markets of one customer instead of mass marketing (Kotler 1989). Technology makes producing customized products a reality. This capability to satisfy buyers' diverse needs highlights the importance of close coordination of marketing and other business functions such as design and manufacturing. (Cravens 1994, 213). Figure 3.2 illustrates the basic differences between mass customization and mass production.

Figure 3.2: Mass customization contrasted with mass production

| | Mass Production | Mass Customization |
|---|---|---|
| Focus | Efficiency through stability and control | Variety and customization through flexibility and quick responsiveness |
| Goal | Developing, producing, marketing, and delivering goods and services at prices low enough that nearly everyone can afford them | Developing, producing, marketing, and delivering affordable goods and services with enough variety and customization that nearly everyone finds exactly what they want. |
| Key Features | - stable demand<br>- large, homogenous markets<br>- low-cost, consistent quality, standardized and services<br>- long product development cycles<br>- long product life cycles | - fragmented demand<br>- heterogenous niches<br>- low-cost, high-quality, customized goods and services<br>- short product development cycles<br>- short product life cycles |

Source: Pine II 1993, 47

One of the requirements for mass customization is market turbulence. Market turbulence can be defined as "the number and magnitude of market events requiring a company's attention per unit of time" (Barker 1988, cited by Pine II 1993, 55). Measuring the actual number of time and significance of events may be impossible. To provide these measures Pine II (1993, 55) has developed a list of factors that, taken together, describe where industries stand on the continuum between low and high market turbulence. These factors are concluded in Figure 3.3. The factors are divided into two categories: demand factors and structural factors.

Figure 3.3: Market turbulence factors

| *Low Market Turbulence* | *High Market Turbulence* |
|---|---|
| Demand Factors | |
| Stable and predictable demand levels | Unstable and unpredicted demand levels |
| Necessities | Luxuries |
| Easily defined needs/wants | Uncertain needs/wants |
| Homogeneous desires | Heterogeneous desires |
| Slowly changing needs/wants | Quickly changing needs |
| Low price consciousness | High price conciousness |
| Low quality consciousness | High quality conciousness |
| Low fashion/style consciousness | High fashion/style conciousness |
| Low level of pre- and postsale service | High levels of pre-and postsale service |
| Structural Factors | |
| Low buyer power | High buyer power |
| Independent of economic cycles | Dependent on economic cycles |
| Low competitive intensity | High competitive intensity |
| High price competition | High product differentation |
| Low to medium levels of saturation | High levels of saturation |
| Few substitutes | Many substitutes |
| Long, predictable product life cycles | Short, unpredictable product life cycles |
| Low rate of technological change | High rate of technological change |

Source: Pine II 1993, 56

Mass customization is a potential approach when there are choice complexity, gap between ideal and available products, high price for customized products and demand for unique products (Hart 1996). Also an increased number of product introductions favor mass customization (Kotha 1996). Next, organizational-design principles that define the relation of mass customization and postponement are discussed.

**Organizational-Design Principles**

Three organizational-design principles together form the basic building blocks of an effective mass-customization program. *First*, a product should consist of independent modules that can be assembled easily and inexpensively. *Second*, manufacturing processes should consist of independent modules that can be moved or rearranged easily to support different distribution-network designs. *Third*, the supply network, including the positioning of inventory and the location, number, and structure of manufacturing and distribution facilities, should be designed to provide two capabilities. First, it must be able to supply the basic product to the facilities performing the customization in a cost-effective manner. Second, it must have the flexibility and the responsiveness to take individual customers' orders and deliver the finished

customized goods quickly. (Feitzinger & Lee 1997). In the next paragraphs these principles are discussed. These sections also link mass customization and postponement concepts together.

*1. Modular product design.* Modular design refers to decomposing the complete product into submodules that can be easily assembled together (Lee & Tang 1997). Because the use of standardized components may increase the cost of materials, companies must carefully assess whether the benefits of standardization outweigh the added costs (see Gerchak et al 1988). The value of common components depends on the uncertainty in product demand across its geographical markets, the lead time to replenish its stocks of parts, the length of the product's life cycle, and on the cost of shipping the finished product. As uncertainty, lead time, and inventory and stock-out costs increase, so do the benefits of standardization. (Feitzinger & Lee 1997)

*2. Modular process design.* Breaking down the production process into independent subprocesses provides flexibility that effective mass customization requires. There are three types of process principles: process postponement, process resequencing (e.g. case Benetton), and process standardization. (Feitzinger & Lee 1997) Only process postponement is discussed because it relates to paint business. The way hardware and paint stores match paint colors is a good example of process postponement. Instead of making a broad range of different paints to meet customers' specific requirements, factories make base paints and a variety of colourants, which hardware and paint stores stock. Actually, the colourants are normally produced by an outside supplier and only delivered through a paint manufacturer (Aulanko, interviews). The stores use a colour measurement system to analyze a customer's paint sample and to determine the paint-and-colourant mixture that will match it. This innovative process provides customers with a virtually unlimited number of consistent choices and, at the same time, significantly reduces the inventory of paint that stores need to stock in order to match every customer's desired colour. The key to postponement was separating the paint-production process into two subprocesses, the production of the base paints and to the mixing of the colourants and base paints. (Feitzinger & Lee 1997). The first subprocess is common to all products and the execution of the second step is postponed. This alternative is effective when the lead time of the first step is significantly longer than the second step that is being delayed. In addition, this

approach is effective when the second step is a high value-added activity. (Lee & Tang 1997) This subject will be discussed in detail later in this chapter.

*3. Responsive Supply Networks.* The third element of the organizational-design relates to distribution decisions. When the final customization step takes place on receipt of a customer's order, it becomes cost effective to have more distributors. In addition, having distributors perform light manufacturing can help the manufacturer to respond to customers who are unwilling to wait a long time for a customized product to be shipped from a factory. Light manufacturing in distribution channel may allow higher prices in paint business because customers often see the distributor not only as a shopkeeper but also as a paint producer (Aulanko, interviews). In this way, a company can both concentrate its manufacturing of critical parts to achieve economies of scale and at the same time maintain a local manufacturing presence. (Feitzinger & Lee 1997)

## 3.2 Form Postponement

The key to effective mass-customization is postponing the task of differentiating a product for a specific customer until the latest possible point in supply network (Lee et al 1993, Lee & Feitzinger 1997). Before going any further in the subject it is worth redefining the concept of form postponement. There are two definitions made by leading authors in postponement discussion. Nevertheless, these definitions are quite narrow.

**1) Form postponement (Bowersox et al 1986, 57):**
"concept of retaining the product in a neutral status as long as possible in the manufacturing process"

**2) Form postponement: (Garg & Lee 1997,1):**
"the strategy of delaying product differentiation until as late as is cost-effective"

The first definition assumes that it is worth postponing as long as possible in every case, which is a little confusing. The second definition argues that by taking into account only the cost factors the best postponement solution can be found. This definition seems to be very production and logistic orientated, in other words, marketing values are not included. The previous section suggested that form postponement enables customer orientated actions, for instance virtually unlimited colour choice in paint business (see Lee & Feitzinger 1997). Thus,

form postponement can be the key to mass-customized products in an effective way which may increase revenues, not only reduce costs. On the other hand, if the supply chain consists of independent members, each one should obtain its own part of the additional benefits. Otherwise, compensations between channel members should be determined, which might be difficult to implement. Based on these arguments the author has formulated the new definition for form postponement.

**Form postponement:**

> "the strategy of delaying product differentation as late as possible in the distribution channel provided that it creates additional benefits for each participant".

The point at which the customization is performed is called the point of product differentation. Delaying the point of product differentiation means deferring the customization point to a later stage in the manufacturing system. Therefore, the term form postponement is synonymous with the terms delaying product differentation and late customization. (Garg & Lee 1997, 1)

Form postponement has two main impacts. First, the quantity of different products moved in anticipation of sale is reduced, therefore the risk of mislocation is lower. The second impact is the increased use of warehouses and dealers to perform light manufacturing and final-assembly operations. To the extent that specialized talent or economies of scale do not exist in manufacturing, the process of customization may be best delegated and performed near the final destination market. The traditional mission of the warehouse in some industries is changing rapidly to accomodate form postponement. Mixing paint in a paint store upon customer request, i.e. using tinting systems, is one of the practical examples of form postponement. (Bowersox 1978, 281-282; Bowersox et al 1986, 57-58)

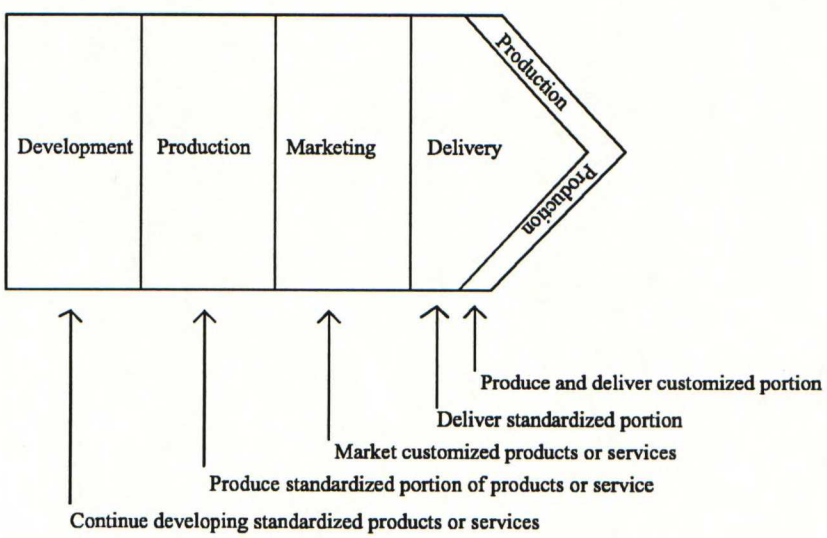
Zinn and Bowersox (1988) have introduced four types of form postponement: labeling, packaging, assembly and manufacturing. This study concentrates on differences between the last two postponement types. Of the other two types, labeling postponement is not often implemented in conventional paint production, because without labels the product type is difficult to determine. However, when the same product is delivered with different brand names to different stores, i.e. private labels, labeling postponement can be used. On the other hand, packaging postponement is not used because it is not practical for fluid materials.

Of the two selected postponement types, *assembly postponement* means warehouse assembly to customer order. The assumption is that a base product with a number of common parts is sold in a number of configurations that are customer unique. The basic distinction between assembly and *manufacturing postponement* is the degree of warehouse assembly. In essence, the manufacturing postponement is a complete job-shop strategy. In manufacturing postponement parts can be shipped to the warehouse from two or more locations, while in assembly postponement parts originate from a single location. The production of soft drinks is an example of manufacturing postponement. Syrup is transported to bottling facilities where sugar and water are added to obtain the final drink. (Zinn & Bowersox 1988)

### 3.2.1 Point of Product Differentiation

The advantages of postponement depend on the location of product differentiation. Based on Porter's (1985, 37) value chain analysis, Pine II (1993, 184) has described how point-of-delivery customization changes the order of activities. The main change is that there is no more gap between customer and production and thus speculation does not exist, as figure 3.4 shows.

Figure 3.4: Changes in the value chain to provide point-of-sale customization

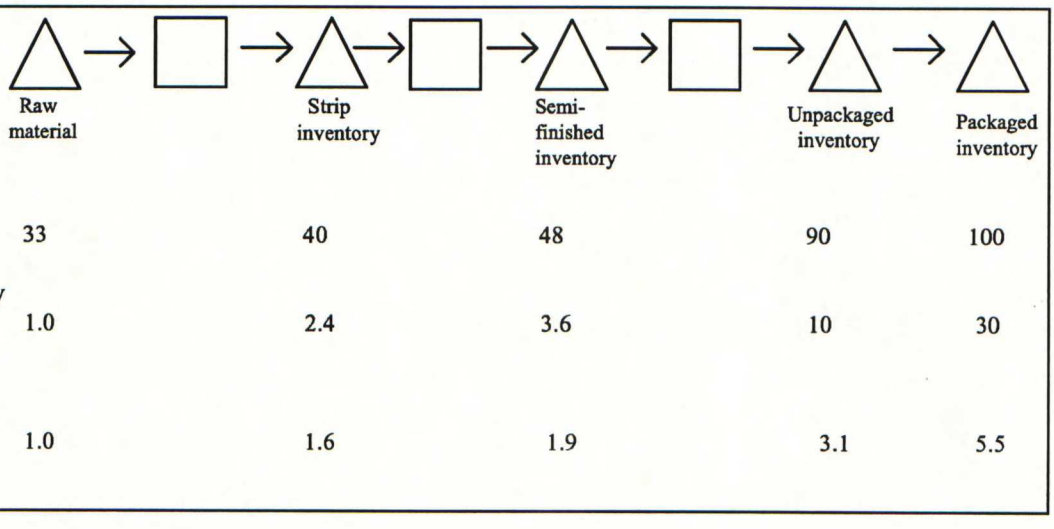



Source: Pine II 1993, 184

Jones and Riley (1987) have analyzed where to position inventories along the supply chain and how much to stock at each point. Table 3.1 gives a generic view on the matter. The numbers

show that keeping stock in common form offers many advantages. First, inventory is stocked at a more flexible stage, as shown by the complexity index. Second, less value has been added at the semifinished stage. Third, forecast error and therefore safety stocks, could be reduced since demand variability was much lower at semi-finished stage. (Jones & Riley 1987)

Table 3.1: Positioning inventory along the supply chain



| | Raw material | Strip inventory | Semi-finished inventory | Unpackaged inventory | Packaged inventory |
|---|---|---|---|---|---|
| Final value (%) | 33 | 40 | 48 | 90 | 100 |
| Complexity index | 1.0 | 2.4 | 3.6 | 10 | 30 |
| Demand variation index | 1.0 | 1.6 | 1.9 | 3.1 | 5.5 |

Source: Jones & Riley 1987

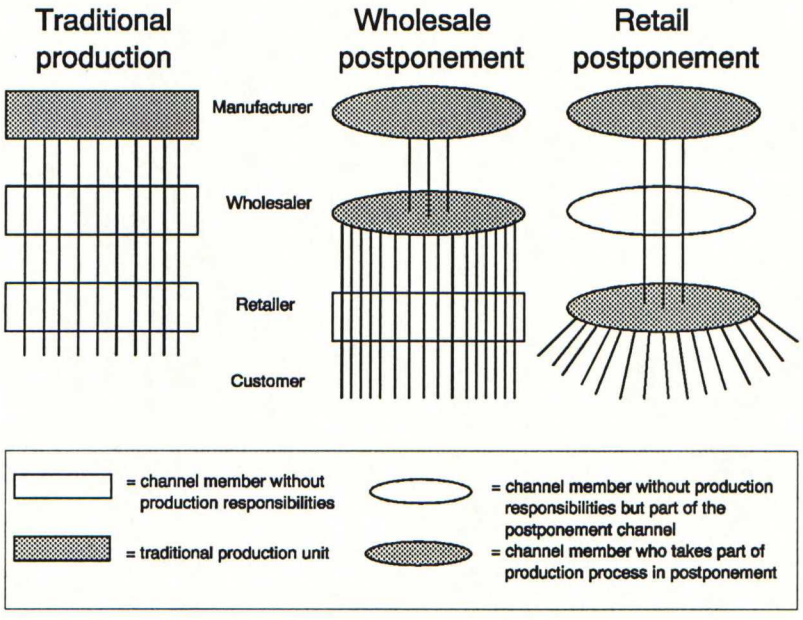
The reallocation of the value addition activities normally requires a redistribution of capabilities among the channel members. The reallocation is both a threat and an opportunity for channel members. (see Coleman et al 1995) For instance, high value addition and customer specific products favor production near the markets.

### 3.2.2 Postponement Levels in Distribution Channel

Level of postponement means the relative location of product differentation. Thus, an *early* level of postponement is one in which the point of product differentation occurs early in the supply chain, whereas a *late* level of postponement occurs late in the chain. (Lee 1994) The possible product differentation points according to Lee (1994) are: end of traditional manufacturing process, distribution center, distribution channel, in transit or by customer. Of these alternatives the focus of this study is on the distribution channel, including both postponement at retail and wholesale level. As Figure 3.5 illustrates, the production is divided into two subprocesses. Production of general components is performed by the manufacturer's

factory. Final manufacturing is performed either by wholesaler or retailer. Use of common components reduce the stock-keeping units between factory and point of product differentation (Davis & Sasser 1995). This study concentrates on one-point product differentation, multi-point differentation is excluded in this study.

Figure 3.5: Breadth of product flow with and without postponement




Postponement implementation at the retail level presents three major differences when compared to the warehouse level. First, retail locations are typically not owned by the manufacturer or distributing firm, which adds an *interorganizational dimension* to postponement implementation. Some retailers may favor postponement, others may reject it. It becomes, in other words, a distribution channel issue (Zinn 1990). Implementation of postponement in distribution channel requires increased cooperation and integration (Richardson 1994; Lee 1996).

The smaller *average size* of a retail store when compared to a warehouse is the second difference. The throughput in a retail location may be too small for the final configuration of an effective scale (Zinn 1990). The final difference is the threat of *product tampering,* which may prevent firms from processing products at the retail level even when it is cost effective. (Zinn 1990)

### 3.2.3 Requirements for Postponement

There are a few requirements for the implementation of postponement. Postponement is more effective to reduce inventories when demand is more variable, products are negatively correlated, transportation time between factory and distribution site is long and the number of product variety is high (Lee & Billington 1994). Negative correlation means that products are not substitutes.

Postponement is effective when errors in demand forecasting are high. Difficulties in forecasting arise from uncertainty regarding future market conditions and are enhanced by the size of a firm's product line. For instance in Benetton, it is clearly more difficult to predict sales for sweaters of a certain color and style than sales for sweaters in general. Thus, the greater the number of colors and styles made, the greater the percentage of error in sales forecasting. (Zinn 1990)

High product value favors the implementation of postponement (Zinn & Bowersox 1988). Lee and Tang (1997) claim that bigger savings in inventory costs can be obtained if high value-added activity is delayed.

### 3.2.4 Performance Factors in Postponement

The performance factors of postponement are discussed in detail at the end of the next chapter, because it requires understanding paint business applications. In general, performance factors can be divided into three categories: investments needed, cost economies and marketing values.

#### Investments

Size of investment depends on the postponement type chosen and capacity alternatives available. One approach to compute the impact of capital investment is to include the annual cost of capital in the computation of the cost of postponement. An alternative approach is to compute the investment payback period in terms of savings from postponement. (Zinn 1990)

**Cost Economies**

The main cost factors in postponement are freight costs, inventory costs and processing costs.

*Freight costs.* Transportation costs can be reduced because of less inventory misallocation. In traditional production a forecasting error causes inventory misallocations because products are supplied to stores on the basis of sales forecasts, creating understocks in some stores and overstocks in others. Typical quick fixes in these situations are costly transfers between stores or price reductions. (Zinn 1990) Deferring differentation tasks to distribution sites decreases the number of different product types delivered to distributors. Thus, it is more likely that a bulk pack can be used in deliveries. (Lee 1994)

*Inventory costs.* Postponement offers a way to reduce the anticipatory nature of physical distribution. To the degree that final manufacturing can be postponed until a customer order is obtained, the risk associated with inventory accumulation is automatically reduced. (Bowersox et al 1986, 15-57; Perry 1991) Advantages of less inventory required are both reduced working capital costs and less shelf-space needed (Christopher 1997, 54). Inventories can be divided into components and finished goods inventories. If product differentation is performed at the retail level, finished good inventories do not exist. If product differentation is performed at the wholesale level some inventories at the retail level usually exist. It depends which one of the following two alternatives is chosen: build-to-order or build-to-stock (see Lee 1996). This decision relates to order penetration point which means the point, where activities cease to be forecast driven and become demand driven. (Christopher 1997, 89; see Bowersox & Morash 1987) Inventory reductions based on standard components can be calculated using the formula of decentralized stocking. The stocks required in centralized stocking are a square root of the number of warehouses in decentralized stocking (see Vepsäläinen 1995, 11). Instead of centralized stocking inventory reductions are based on the use of standardized components. Broader assortment offers higher advantages.

*Processing and material costs.* Assembling in smaller batches does raise production costs (Zinn 1990). On the other hand, standardization of components reduces processing costs (Davis & Sasser 1995). Decentralizing processing to the distribution channel implies

decentralizing quality control as well. This encompasses not only the quality control itself, but also related activities such as equipment maintenance and the training of warehouse labour (Zinn 1990; Lee & Billington 1994).

*Costs of lost sales due to increased waiting time.* According to Zinn and Bowersox (1988), customers may not be ready to wait and go to another store if the final configuration takes a long time.

**Marketing Values**

Postponement in distribution channel creates many marketing values in point-of-sale, including increased customer choice, high service level and long lasting competitive advantage.

*Flexibility and customer choice.* Postponement reduces complexity of manufacturing process (Garg & Tang 1997). Products are assembled in response to a customer order, allowing the firm to improve customer choice of color and styles. Thus, a broad line marketing effort is possible with postponement. (Bowersox 1978, 282; Zinn 1990) Mass customized products should have a higher price than standard ones (Pine II 1993, 47).

*Service level.* Increased availability is obtained with postponement (Lee 1993). Out-of-stock situations are in postponement rare, because stocking common components does not require a huge amount of working capital. Service level depends on the level of postponement. If the final configuration is performed at the retail level, full advantages can be obtained. On the other hand, postponement at the wholesale level requires some compromises. For instance, the extent to which finished goods are stocked at the retail level. For other goods standard delivery times from a wholesaler should be arranged.

*Sustainability.* Postponement decisions require significant changes in manufacturing and distribution practices. The amount of time and organizational commitment required to implement such changes makes a difficult target for emulation by competitors and, hence, postponement offers a source of lasting competitive advantage. (Zinn 1990)

*Internal marketing.* Light manufacturing performed in point-of-sale increases worker morale (Lee 1993).

## 3.3 Summary

This chapter included two major issues in addition to the new definition for postponement. They were the factors that favor postponement and especially factors that determine the impact of postponement on channel members' performance. The factors that favor form postponement were discussed in the context of mass customization (Section 3.1.2) and in requirements of postponement (Section 3.2.3). The factors can be categorized into three groups: demand/market factors, logistical factors and product factors. In addition to these factors, a high value of postponed activity is an important issue (Lee & Tang 1997). The factors are summarized in Figure 3.6.

Figure 3.6: Factors that favor form postponement

| Demand/market factors | Logistical factors | Product factors |
|---|---|---|
| - gap between ideal and available products<br>- demand for unique products<br>- high price for customized products | - high inventory holding costs<br>- long lead times in deliveries<br>- high freight costs<br>- demand uncertainty (high product variety, stock-out costs; obsolescence) | - short product life cycles<br>- increased number of product introductions<br>- products are not substitutes (negative correlation)<br>- high product value |

Source: Zinn & Bowersox 1988; Pine 1993, 56; Lee & Billington 1994; Hart 1996, Kotha 1996, Feitzinger & Lee 1997

The factors in the channel members' performance can be divided into three groups: investments, cost economies and marketing values. They are summarized in Figure 3.7. The sources of these factors can be directly found in Section 3.4.

Figure 3.7: Performance factors of postponement

| Investments | Cost economies | Marketing values |
|---|---|---|
| - new processing equipment needed in-point-of product differentiation | - freight costs<br>- inventory costs<br>- processing and material costs<br>- cost-of sales due to increased waiting time | - flexibility and customer choice<br>- service level<br>- sustainability<br>- internal marketing |

# 4. Postponement Solutions in Paint Business

The focus of this chapter is on assembly and manufacturing postponement in paint business. The analysis is based on three performance categories determined in the previous chapter. Details inside these categories are mainly found from professional literature on the paint and colour processing industry. The colour processing systems include both tinting systems (for assembly postponement) and a miniplant system (for manufacturing postponement).

This study concentrates on postponement solutions in the distribution channel, in other words, solutions for the factory warehouse are not discussed profoundly. The postponement solutions at the paint factory are used in direct deliveries to end-users, for instance to large projects. In any case, the first step toward large-scale use of colour processing systems is to acquire a machine at the factory warehouse.

## 4.1 Assembly Postponement - Tinting Systems

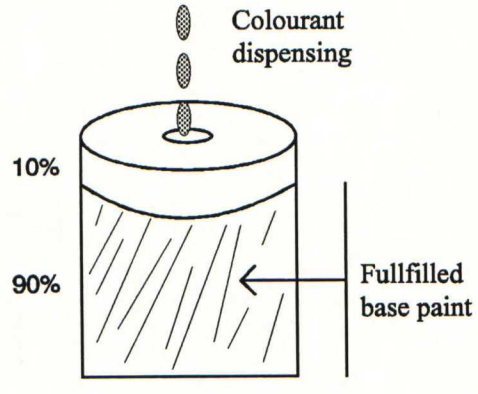
Assembly postponement in paint business means tinting systems. These systems are normally offered by distinct suppliers, which deliver either the whole system or just separate components. According to Dörper (1996) integrated tinting system consists of six components. First, the paint manufacturer has to begin to produce three *base paints* instead of ready colour shades. This is a component that a system supplier does not normally deliver, rather, the supplier acts as a consultant in the beginning. Second, there are normally 16 *colourants* in the tinting system. This is an important selling component, because it gives ongoing sales to the supplier, in other words it is consumable. Third, a customer needs *dispensing and mixing equipment.* There is a wide range of automatic and manual dispensers available, with equipment suitable for different locations and volume trends (Dörper 1996). In Appendix 4 both automatic and manual tinting machines are illustrated. There is also a list of tinting terminology.

Fourth, *technical support* consists of assistance with implementing an integrated tinting system, including technical training and system maintenance. According to Dörper (1996) this is probably the most important component and should guide the paint company from product

choice to complete system handling. Fifth, *colour software* represents the high-tech part of the tinting system. It includes large databanks with colour formulae and comprehensive software for accurate matching and design. The software also integrates the tinting process with automatic dispensers. The sixth and last component is *colour marketing material*, which includes standard or customised colour cards and displays to enhance the marketing of colours and to create an awareness of available options. This is often neglected in the marketing of paint. (Dörper 1996) An additional component is a colour measurement system, usually a spechtrophotometer. It allows the production of colour shades based on customers' samples.

Delayed product differentiation to the distribution channel, for instance paint shops, is performed using in-can tinting, which is shown in Figure 4.1. In-can tinting means that the paint cans have been filled with base paint up to 90% in the factory and there is a space of 10% for colourants. The understanding of the in-can tinting principle is important, because it means that space needed in transport is bigger than without postponement, because both colourants and base paints are transported between channel members instead of ready paints. This is against the assumption made by Zinn and Bowersox (1988) who argued that transportation costs could be lowered due to less space needed.

Figure 4.1: In-can tinting




Hukkanen (1995) has calculated the costs, in other words, cost economies and investments, of the three different production methods: direct milling, in-plant tinting and in-can tinting. The results suggested that in-can tinting is the most cost-effective method in batch sizes less than one thousand liters.

Retailers and wholesalers normally sell both white and coloured paints. The normal practice is that tinting systems concerns only coloured paints, production and distribution of white paints remain the same as before tinting systems. Unlimited colour offer and better margins than before in coloured paints often increase the share of coloured paints in sales step by step. The traditional practice has often been to sell all products at the same price which has meant that relatively expensive coloured paints have had lower margins than white paints. It follows that selling of white paints has been the main business. With tinting systems the channel members use price levels which are set depending on the use of colourants. (Aulanko, interviews)

Many manufacturers offer paints in many quality levels, from bulk to high-end products. The postponement suppliers' guide to the paint manufacturers is that focus of marketing should be on high-end products because of higher margins possible (Dörper, interviews).

### 4.1.1 Investments

Tinting systems can be divided into two main categories: manual and automatic machines. Volumes and types of dispensing equipment inluence advantages of tinting systems (Immonen 1994; Hukkanen 1995). To illustrate the differences between these machines, annual capacity of manual systems is 15,000 - 50,000 liters and the capacity of largest automatic systems is about 500,000 liters. (Aulanko, interviews) On the other hand, automatic machines are much more expensive that manual ones. Cost of manual dispensing machines with mixers is about US$ 5,000 and automatic systems about US$ 10,000 - 50,000. The accurate system representations will be made in the empirical part because they are company-specific issues.

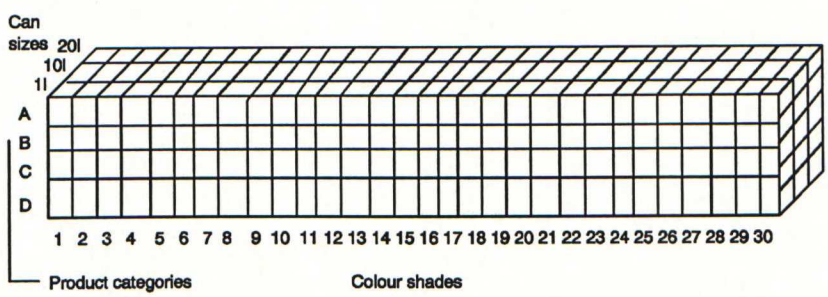
### 4.1.2 Cost Economies

*Freight costs.* Tinting systems reduce the number of alarm deliveries because service level is higher than before. Because of base paints the demand forecasting, order processing and order picking are simplier to implement (Koski 1993; Immonen 1994). Full pallets can often be used in transportation of large orders. The long distances is a reason for high penetration rate, about 90 percent, in Scandinavia (Jousimaa 1995).

*Material and processing costs.* There are three issues that influence the production costs with tinting system: reproducibility, economies of scale and cost of colourants. When a manufacturer begins to produce base paints, consistency in successive batches have to be guaranteed (Suikki 1994). Otherwise production of accurate colour shades in later stage would be impossible. This causes some extra work in the beginning of the system use. On the other hand, production of larger batches than before at the factory enables scale economies and decreased costs because of the following factors: less waste, less down time, less cleaning, etc (Koski 1993). However, cost of colourants increase material costs. (Aulanko, interviews) Furthermore, work duties increase in the point of product differentiation.

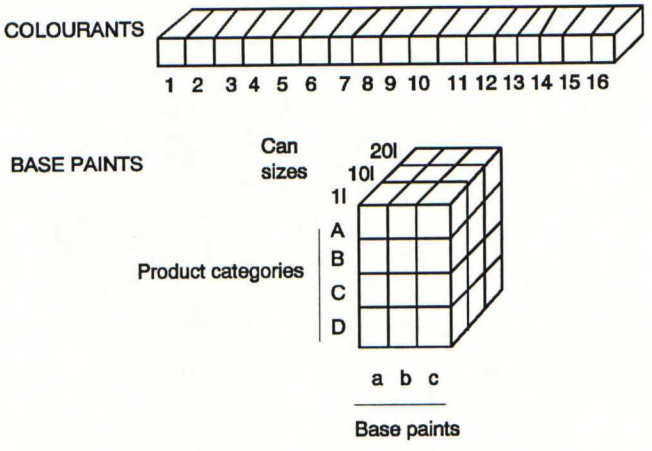
*Inventories.* Use of tinting systems reduce stockholding costs. At the factory, in addition to finished good inventories also pigment stocks can be decreased. The size of product range affect inventory reductions (see Hukkanen 1995). Thus, the number of following factors are important: can sizes, product types (e.g. quality levels*usage purposes), and colour shades. The greater the variety demanded, the higher the advantages of postponement. Also gloss levels should be taken into account. The following example illustrates the inventory reductions. The producer A, who does not use a tinting system, offers four products in three can sizes with a color offer of 30 colours. In order to have 100% service level A needs 4*3*30 stock-keeping units (360 units in stock). Producer B, using a tinting system, offers four products with three base paints in three can sizes. For 100% level of service, B needs 4*3*3 (36) stock-keeping units plus the amount of colourants in his system. Assuming this is 16, the total amount of units in stock will be 52. An important difference between A and B is also that B is capable of offering an almost unlimited amount of colors. (Jousimaa 1995). Figure 4.2 shows the situation without tinting systems, 4*3*30= 360 stockkeeping units.

Figure 4.2: Number of stocked articles without tinting systems



With a tinting system, 16 colourants suitable for all product categories and 4*3*3 (36) base paints are needed, which means 52 units. Figure 4.3 illustrates this situation. In traditional production the circulation of some paints is very low or non-existing. With base paints the inventory circulation is much higher. (Jousimaa & Suikki 1995) The higher inventory turnover also decreases the risk that paints would be spoilt.

Figure 4.3: Stocked articles with tinting systems




The inventory reductions depend on the place of final configuration. Ín wholesale postponement the retailer does not obtain full advantages of postponement because the retailer must stock the needed variety. Another alternative is that a customer orders paints based on colour card and waits the delivery from the wholesaler. When a wholesaler locates near the retailer it may allow a pick up of a paint-can within the same day. Aulanko (interviews) argues that in small can sizes the order costs often exceed the profit margins. Thus, small cans should be available by retailer.

*Marketing material costs.* Obtaining the full advantages of tinting system in point-of-sale, colour cards and colour displays are needed. Colour cards are normally paid by the manufacturer and distributors pay the colour displays. Moreover, the manufacturer often invest in advertising to inform customers about tinting systems. In Scandinavia, colour marketing costs are about 1-2% from sales turnover, in countries where tinting systems are not used in large extent, colour marketing costs can be less than 0.1% of manufacturer's sales turnover.

### 4.1.3 Marketing Values

*Colour choice.* In traditional paint production the colour choice is limited into 40-60 colour shades (Koski 1993). With tinting system an unlimited number of colour shades is possible to offer and thus colour can be a marketing tool to early innovators (see Dörper 1996). With broad colour choice the retailer or wholesaler can differentiate from competitors and this way get rid of keen price competition. (Aulanko, interviews)

Using a tinting system allows a customer to choose the colour shade which means that the paint manufacturer does not have to anticipate customers' needs. Customer can get almost any colour shade he/she desires, because colour formulaes for thousands of colour shades exist in a databank of tinting system. Customer can also bring a sample along, and the colour measurement system calculates a colour formulae for this colour shade. The customer has to wait only for a few minutes and then he/she gets a ready coloured paint can. Before tinting system he/she had to choose between stocked items that manufacturer had produced and delivered to the retailer. So, tinting system means in some extent a shift from push to customer-orientated pull system.

*Service level.* Tinting systems allow a better service level than traditional practices without high inventory levels. With traditional way the service level (= availability of requested product in requested can size in requested colour in requested time) at distribution outlets is hardly ever higher than 70%. A higher level would tie-up unnecessarily high amount of capital. The service level with tinting is often 95% or more, as the colour requested is made locally as a spot service. (Suikki & Jousimaa 1995). Because assembly postponement can be performed in a very short time, five to ten minutes depending on dispensing equipment, it can be argued that the lost of sales does not occur in retail postponement, like Zinn and Bowersox (1988) have suggested. As discussed in Section 2.4, a financial measure for service level improvement is to calculate decreased of out-of-stock costs.

*Large service network.* Construction firms usually buy the large accounts direct from the manufacturer. However, they often need small amounts more during the project. The alternatives of the contractor depend on the situation of paint manufacturer. If the

manufacturer uses **traditional production methods**, the contractor buys the paints direct from the manufacturer with whom the deal was made. In that case the delivery can last more than a week. Both the manufacturer and the contractor are dissatisfied with the situation: the contractor has to wait for the long time and the manufacturer has to sell the small and expensive batch at the same price than the large one because of the deal. If the local retailer (or wholesaler) has the **manufacturer's tinting system in the shop**, the contractor gets the paint within five minutes and is often ready to pay a little bit higher price for the quick service. On the other hand, the manufacturer can sell the base paints to the retailer's stock with good margins. So, in this alternative both parties are satisfied and in addition the distributor gets extra profit. (Aulanko, interviews)

*Sustainability.* Beginning of the production with tinting system requires an introduction of half year. If the preliminary negotiations and other issues are taken into account, time required for implementation is longer. From tinting system supplier's point of view this is a little bit tricky issue. On one hand, a long lasting competitive advantage is offered, but on the other hand, the short implementation is also one of the goals.

*More space for other articles.* Because of lower inventories the shopkeeper can take new paint products or other hardware goods, e.g. wallpapers, for sale which generates more cash flow than before (Laitala, interviews). For the manufacturer the production of base paints facilitates the launching of new paint lines (Suikki 1997).

*Environmental-friendly.* Environmental aspects are mentioned as an advantage of tinting systems due to less waste in production and environment-friendly materials used (Immonen 1994).

The marketing values may both increase the sales and allow a higher price level. Actually, it depends on marketing strategy. In the beginning the main target is often to obtain higher market through sales increase. After the tinting systems can be found the majority of retailers/wholesalers, the price level is increased in all outlets at the same time. (Aulanko, interviews)

## 4.3 Manufacturing Postponement - Miniplant

Another postponement type in paint business is manufacturing postponement, in other words miniplant. Miniplant concept is not in use anywhere but a postponement supplier is constructing a pilot. As a system miniplant includes four same components as tinting systems and two different ones. A difference is that instead of base paints a manufacturer begins to produce components. Another difference is that in addition to the colourant dispensing machine a dosing equipment of paint components is needed. Compared to assembly postponement, manufacturing postponement allows to postpone not only the colour shade but also the product type and gloss level decision. (Aulanko, interviews) The components are represented in Table 4.1.

Table 4.1: Components for producing base paints in miniplant

| Components of paint | Amount | Notice! |
|---|---|---|
| Titaniumdioxide | 0-1 | For white paint only |
| Fillers | 2-3 | |
| Binders | 5 | Determines the paint quality, only 1/ paint |
| Others | 3-6 | |
| => Maximum amount | 15 | |

Source: Aulanko, interviews

With these 15 components all normal decorative paints can be produced. For one product 5-6 components are needed. Thus, the total number of components does not depend on number of product types on the market. The number of colourants is the same in both systems. In channel member's performance many factors are the same as in tinting systems and thus only the factors that differ from tinting systems are discussed.

### 4.2.1 Investments

Price of this system is estimated to be 3-4 times more expensive than the large automatic machines. Miniplant would locate in wholesale level because it would be too expensive and large for retailers. The capacity of miniplant is estimated to be annually about 1 000 000 liters. Thus, miniplant is able to serve many small retailers. The miniplant could also act as the direct selling point for project and other large buyers. Manufacturers may acquire the miniplant for

direct selling at the same time as the wholesalers do. Only a few tanks of one thousand liter for transportation of fluid components to wholesalers is needed. (Aulanko, interviews)

### 4.2.2 Cost Economies

*Processing costs.* Simplified manufacturing process, only fifteen components, offers economies of scale to the manufacturer. Otherwise, the main production process remains the same at the factory but the wholesaler takes care of the final phase of the manufacturing process, dosing of components to the cans. In wholesale level one person is needed to take care of production but any kind of special education is not required for this job. A disadvantage of miniplant is the extra packaging of materials between the paint manufacturer and the wholesaler (Aulanko, interviews).

*Inventories.* Inventories of finished goods in retail level remain the same level as in traditional production. One of the main questions are the shares of built-to-stock and built-to-order procedures. Thus, comparison between inventory and out-of-stock costs have to performed. In Table 4.2 a comparison of inventory levels between miniplant, tinting systems and traditional production is made. Using the formula of decentralized stocking the inventory reductions both compared to traditional production and tinting systems can be calculated. For instance, delivery times and the present stock levels help to determine the difference between these options. As the tank size in miniplant is 800-1000 liters, high and variable demand favors miniplant compared to tinting systems.

Table 4.2: Inventory comparison (number of articles)

| | Traditional production | Tinting systems | Miniplant |
|---|---|---|---|
| Products | 10 | 10 | |
| Gloss levels | *2 | *2 | |
| Can sizes | *3 | *3 | |
| Colour shades | *20 | (Base paints)*3 | |
| **Total** | = 1200 | = 180 | = 15 |
| + others | - - - | 16 colourants | 16 colourants + 3 empty cans |

Source: Aulanko, interviews

### 4.2.3 Marketing Values

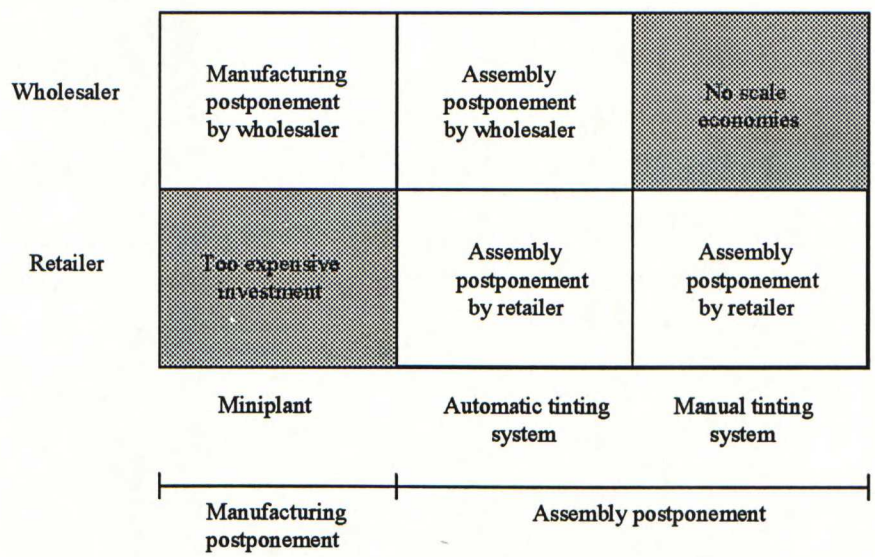
*Service level.* Because miniplant does not suit retailers, same service level as with tinting systems by retailer cannot be obtained. Colours with small sizes and high turnover have to be delivered to retailer in advance. Colours with low turnover and seasonal demand can be produced against a specific order. However, compared to tradional methods the retailer can promise standard delivery times to its customers. Small batches are effective to produce in miniplant and thus also small orders can be separately fullfilled. In tradional paint factory only large batches are cost-effective to produce (see Hukkanen 1995).

*Other factors.* Sustainability and colour choice can be assumed to be the same as in assembly postponement.

## 4.3 Analysis of Different Postponement Alternatives

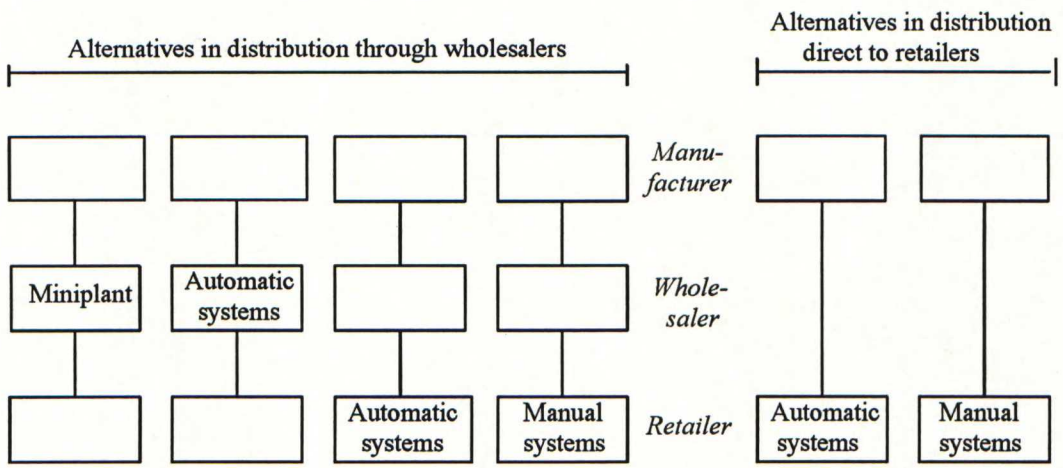
Four postponement types are illustated in Figure 4.5. As discussed, manufacturing postponement is economic only at wholesale level. On the other hand, manual systems have too low capacity for wholesale level.

Figure 4.4: Four postponement types in paint business



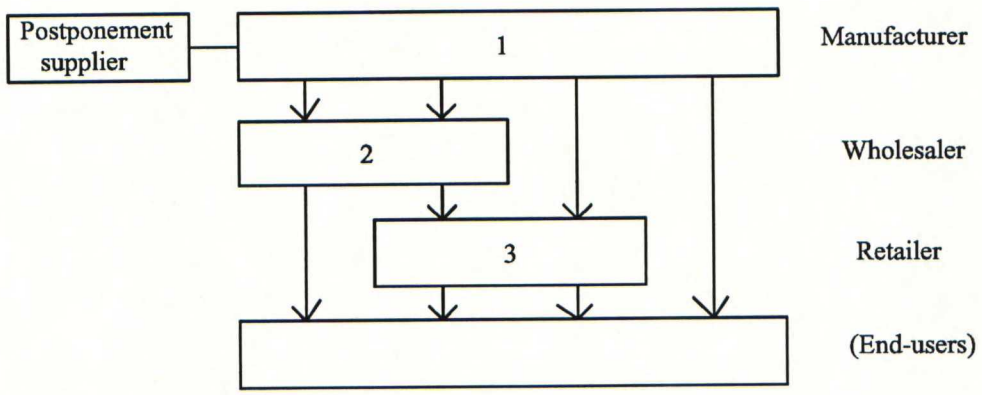
The figure above and division of channels into two options, from manufacturer to retailer and from manufacturer through wholesaler to retailer, means that six postponement solutions can be found. They are illustrated in Figure 4.5. Assembly postponement with automatic machines is possible in three solutions, assembly postponement with manual machines in two solutions and manufacturing postponement only in one solution. Product flows and analyses of four alternatives are in Appendix 5. These examples represent the most probable ones. Direct deliveries from manufacturer through the retailer with a manual machine and deliveries from manufacturer through wholesaler to retailer with an automatic system are excluded in these examples. The reason for the exclusions is the assumption that a retailer which is capable of buying an automatic machine orders paints direct from a manufacturer. On the other hand, a retailer with manual machine needs wholesaler because of thin product flows.

Figure 4.5: Postponement alternatives




The postponement implementation is often performed in phases. The manufacturer first acquires the system at the factory and begin the base paint production. At the later stage the postponement solutions for distributors' outlets are discussed. The wholesalers and large retailers are the most propable users in the second phase and the implementation in normal retail stores is performed later. The penetration rates in different countries often follow S-curve. (Laitala, interviews) The phases are illustrated in Figure 4.6.

Figure 4.6: Phase model




Miniplant, automatic machines and manual machines have their own capacity limits which partly determines which system could be chosen. Nevertheless, the channel members do not always choose the alternative which is just enough for the present purposes. Thus, growth potential has to be taken into account.

Next the behaviour of the performance factors in different situations is discussed closer. To begin with, miniplant is compared to automatic system in wholesale level. In addition, automatic tinting systems are compared to manual ones in retail level. Third, factors that depend on postponement level are discussed.

### 4.3.1 Miniplant versus Automatic Machines

As earlier mentioned, miniplant offers greater inventory reductions compared to tinting systems when product assortment is broad enough. Another factor that favors miniplant is long delivery times because it forces to keep high buffer stocks. Especially when demand forecasting causes problems use of fifteen components can offer great advantages.

Miniplant also has other advantages. Big orders are easier to implement in miniplant because the wholesaler does not have to know in advance the demand for each product type. Thus, miniplant allows to produce large batches which is the advantage in selling to big customers like construction firms and contractors. One advantage of miniplant is standard filling rate. In tinting systems the filling rate depends on amount of colourants needed.

On the other hand, automatic systems are more handy to produce small orders. Especially if wholesaler also sells direct to normal end-users in short notice, tinting systems work better than miniplant. A wholesalers with tinting systems can deliver goods within five minutes, on the other hand, the principle in miniplant is that orders should be given in advance. Automatic systems do not need so much space in the outlet than miniplant with big tanks.

### 4.3.2 Automatic versus Manual Machines

Automatic machines represent more high-tech than manual machines. It is sometimes an important selling arguments because channel members may want to show to their customers that they have modern systems. Automatic machines are quicker to use than manual ones, which means that customers can get a can within five minutes compared to ten minutes with manual systems. Especially if the shopkeeper sells many big cans to the same customer, e.g. to professionals, use of automatic system is more comfortable to both parties.

A disadvantage of manual machine is that the shopkeeper has to read the formulae from computer and carefully dispense the colourants with his own hands. For this reasons, automatic machines are more reliable than manual ones because human error is not possible in automatic version (Gootjes, interviews). Because the dispensing of colourants with manual machines takes longer time and requires more attention, the waiting customer does not get any attention. With automatic system the machine takes care of dispensing and the shopkeeper can other articles during the waiting time. (Aulanko, interviews) In very small volumes the manual system works better than the automatic versions because drying of non-used colourants does not cause big problems in manual machines.

### 4.3.3 Postponement at Retail versus Wholesale Level

Postponement at retail level offers a higher service level to customer compared to postponement at wholesale level. Also the full inventory reductions at retail level can be obtained. In postponement at wholesale level the speculation between the wholesaler and the retailer remains. So, the retailer must stock the paints as before postponement. The retailer has the same colour card as in postponement at retail level but only the most famous colours can

be delivered immediately. For other colours standard delivery times from wholesaler can be promised. Christopher (1997, 131) proposed that fast cycling products could be stocked at retail level. The slow cycling products could be produced from order at wholesale level. The large offer of delivered-from-order colours may lead to many small and expensive shipments between retailer and wholesaler, so-called emegency orders. It is not so sure that customers would ready to pay the same price premium as in postponement at retail level for unlimited colour choice if they did not get the paint immediately. The use of colour matching system based customers' sample is also more difficult in wholesale postponement because the sample has to be delivered to the wholesaler.

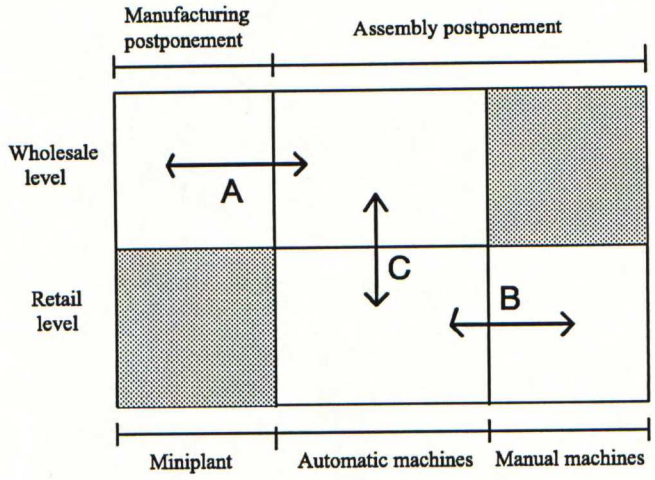
The advantages of postponement at wholesale level are financial capability and higher volumes than at retail level. In other words, wholesalers are more often capable of buying high class machines because the volumes are higher than at retail level.

An interesting issue from the paint manufacturers' point of view is the commitment level of retailers in wholesale postponement. If retailers do not have the tinting system, they may continue to buy different manufacturers' products as before postponement. Thus, the manufacturer may not get a greater share of retailers' sales than before postponement. Penetration would be higher at retail level, which would give the manufacturer possibilities for large-scale marketing efforts.

## 4.4 Summary

The key issues in the performance analysis of different postponement alternatives are summarized in Figure 4.7. In direct deliveries from the manufacturer to the retailers, only point B has to be analyzed. On the other hand, in deliveries through wholesalers to retailers all comparisons have to be made.

Figure 4.7: Key issues in performance analysis




A. *Miniplant vs. tinting systems*. Factors that favor miniplant are long delivery times between wholesalers and manufacturers and customers' large orders. Factors that favor tinting systems are smaller space needed in the store and short delivery times for small orders.

B. *Manual vs. Automatic machines*. Manual systems are cheaper than automatic ones and work better in small volumes. On the other hand, automatic systems represent high-tech and are quicker to use.

C. *Postponement level*. Using the phase model, postponement at retail level follows postponement at wholesale postponement. However, if sales of the retailer are very small, retail tinting may not be profitable at all. The financial capability and possibilities to acquire a large and quick systems are the main advantages in wholesale postponement. On the other hand, in postponement at retail level the speculation and emergency orders do not exist anymore.

# 5. Paint Markets and Distribution Practices in Eastern and Southeastern Asia

Colour processing systems are not widely used in Asia compared to Europe and North-America. It is estimated that the penetration rate of tinting systems in North-America is almost 90%, in Europe between 20-90% and in Asia 0-5%. Penetration in Asia is considerably lower due to the different structure of markets, marketing, consumer behaviour and also in large part due to low per capita income and low labour costs. However, in many of these aspects remarkable changes are taking place, which indirectly means that demand for point-of-sale tinting systems is increasing. (Moody 1996; Aulanko, interviews) This is one of the reasons for studying this area. As a sign of growing interest is that three companies in the USA have begun to work closely together to promote tinting systems (TPF 1996).

In this chapter three issues are discussed: first, product and demand factors in paint markets; second, logistical factors; third, channel members and their roles now and in the future.

## 5.1 Paint Markets

This study concentrates on six countries: Japan and South-Korea belong to Eastern Asia, and Indonesia, Malaysia, the Philippines and Thailand to Southeastern Asia. Developed countries comprise only Japan. Newly industrialized countries include South-Korea and the rest can be categorized as rapidly developing countries. (SY 1997, 149-166) The reason for excluding city states like Singapore and developing countries like Vietnam is that city countries have special logistical features, e.g. short distances, and market potential in these countries is quite small. Market potential is also the main reason for excluding developing countries. One criteria was that the six selected countries would represent as well as possible the different sides of Eastern and Southeastern Asian countries. The basic statistics of Eastern and Southeastern Asia can be found in Appendix 5.

The different national business systems in Southeast Asia are systematically similar in many ways which makes an attemp to analyze them together both feasible and useful (Lim 1996). One common feature is the considerable economic significance of Chinese in Southeast Asia. Collectively they control a larger share of trade than do other ethnic groups in that area. In

Indonesia, for instance, Chinese account only 3% of the population but about half of the trade and 75% of the private domestic capital is in their hands. The Chinese conglomerates command a strong presence in manufacturing, wholeselling, and retailing in Indonesia. (Hodder 1996, 3)

Nevertheless, in the Southeastern Asia the countries are extremely heterogeneous both among and within themselves in terms of level of economic development, political system, ethnicity, and culture. Unlike Western countries and Japan, business systems are very dynamic, i.e. constantly evolving due both to immaturity or incomplete development and to extremely rapid economic growth. Also a long history of colonization by Western powers, early integration into the world economy, and continuous openness to foreign trade and investment have resulted in a high degree of penetration by and absorption of external forces players. The result is a highly complex, diverse and ever-changing hybrid system which does not lend itself easily to analysis. (Lim 1996)

Population is an indicator of market size. Table 5.1 suggests that there are over 500 million people in the six target countries. Indonesia ranks the fourth populous country in the world (Dunung 1995, 297). The population in Japan is estimated to remain about the same in the next few years, but in other countries growth rates are quite high. The overall population itself can be a misleading measure of market size, and for this reason it is also worth evaluating the consumption of architectual paints.

Table 5.1: Population, and consumption rates of architectual paints in 1996

| | Population (Millions) | Consumption (thousands of tons) | Consumption/capita (kg/capita) |
|---|---|---|---|
| Japan | 125,1 | 608 | 4,9 |
| S-Korea | 45 | 287 | 6,4 |
| Indonesia | 197,6 | 150 | 0,8 |
| Malaysia | 20,1 | 70 | 3,5 |
| Philippines | 67,6 | 151 | 2,2 |
| Thailand | 58,8 | 76 | 1,3 |

Source: Modified from AP 1997, 9-59

Japan and South-Korea have a greater per capita consumption of architectual paints than other countries. Paint consumption per capita has increased in South-Korea significantly in recent years. The growth rates have also been relatively high in Indonesia and Thailand, but they still have a long way to go before becoming more industrialized countries. (AP 1997, 59-60)

The more mature the country, the more diversified are the needs of customers. In general, product assortment available in paint stores is assumed to be quite narrow. Colour marketing does not play major role, instead retailers sell paint cans and paint types and the last thing is the colour shade. (Aulanko, interviews) Paint quality is quite low in many countries. For in instance Thailand, household decorative paint is a very low margin commodity. As there are too many low-cost producers of emulsion paint selling unbranded products, it undercuts prices of well-known brands. (Na-Thalang 1996) However, it is estimated that paint manufacturers may broaden their product range in the near future (AP 1997, 161-182).

## 5.2 Logistical Factors: Archipelago and Infrastructure

*Archipelago.* Archipelagic nature is one of the special logistical features of this area. However, in South-Korea and Thailand islands have only minor significance. In Japan the four main islands constitute 98% of the territory (CSA 1995, 14). However, because of developed inter-island connections islands do not play major logistical role in Japan (Vuoristo 1997, 81). The importance of islands is greater in Malaysia, Indonesia and the Philippines. Malaysia consists of two main parts, Peninsular Malaysia and East Malaysia, which is the northern part of Borneo island. Peninsular Malaysia includes a number of small islands. (Demaine 1997b)

Indonesia extends more than 4,800 kilometers from east to west and 2 000 kilometers from north to south. Indonesia is the world's largest archipelago, consisting of 13 500 islands, of which about 6,000 are inhabited. The islands Java, Madura and Bali, which comprise about 10% of the total area of Indonesia, contain almost 70% of its population. The Philippines is a archipelago made up of approximately 7 000 islands. Of its many islands, some 880 are inhabited. About 95 percent of the population resides on eleven largest islands. (Dunung 1994, 272-308)

In archipelagic countries seatransport is the main transport mode between manufacturer and distributor for heavy products like paint. As a transportation mode seatransport is slow, and normally land transport is needed before and after seatransport (Caspers & Brugge 1993).

*Infrastructure.* In developed and non-archipelag countries, namely in Japan and South-Korea, level of infrastructure is higher than in Southeastern Asia (Vuoristo 1997, 81). In South-Korea, all major cities are connected by modern highways and national roads which enables reaching any place in Korea within a day (KAG 1994, 7). On the other hand, in Thailand level of infrastructure despite of modern main roads is generally quite low and the improvements have begun very slowly. Another problem is traffic which makes transportation very difficult especially in Bangkok and in its neighborhood. (Inkinen & Lahtinen 1994, 217-220)

In archipelagic countries the level of infrastructure seems to differ a lot depending on the area. In Peninsular Malaysia transport communications are more highly developed than in East Malaysia (Demaine 1997b). In Indonesia, despite significant improvements brought by many investments, many transport facilities remain inadequate and continue to inhibit economic development. (Demaine 1997a) The Philippines' physical infrastructure is characterized by market regional disparity, which both reflects and reinforces the concentration of modern economic activity in Metropolitan Manila and regions immediately adjacent. An example of this feature is that less than half of road network is all-weather, and small roads are in poor condition. (Demaine 1997c)

## 5.3 Distribution Channels

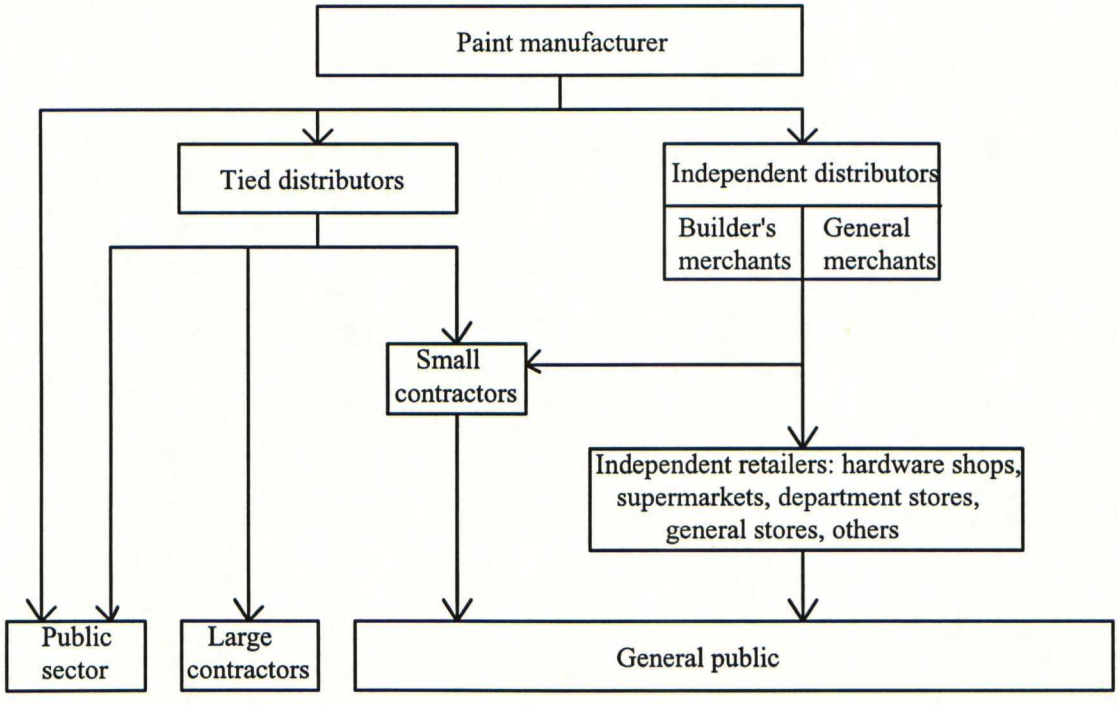
The purpose of this section is to give an overview of channel structures and channel members' roles in Eastern and Southeastern Asia. A basis in analysis of channel structures is that most of the decorative paint in Asia is applied by third parties. For instance in Japan and South-Korea, the usual practice has been to ask for a familiar builder from neighborhood. The retailers usually also offer renovation services in addition to paint products. One reason for this behaviour is that in Japan men do not have time for renovations. (Hirao, interviews). In Southeastern Asia, the relatively low cost of labour causes that more than 90% of the market

is serviced by professional decorators in contrast with the roughly 60:40 split (professionals:DIY) observed in more affluent countries. (Scopes 1996) Thus, channel structure is designed to serve construction firms and other professionals. As the price of labour rises there seems little doubt that consumers of good quality paints begin to do their own decorating (Jobson 1996).

### 5.3.1 Channel Structure

In Asia, the paint distribution in most countries is conducted through the traditional modes of selling directly to the larger customers, as well as through merchants and distributors. The structure that is illustrated in Figure 5.1, is the traditional channel for decorative/ architectural paints. There are several types of wholeselling organisations, basically divided into those that are owned by paint companies, and to those that are independent. However, many of these independent groups may sell the products of a particular manufacturer on an exclusive basis. (AP 1997, 73-75)

Figure 5.1: Channel structure for decorative paints in Asia

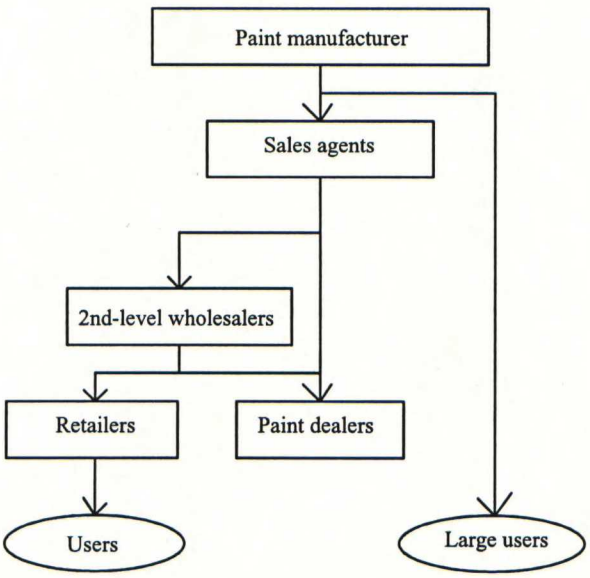



Source: Modified from AP 1997, 74

Sales through independent wholesalers is favored by the majority of paint companies. These wholesalers often operate on a local/regional basis. Paint may be offered as the major product by some wholesalers, but most offer ancillary of complementary products. Some paint companies may sell direct to the building contractors and to the public sector, and to some larger retailing concerns. (AP 1997, 73-75)

The only countries whose paint distribution channels can be found separately described are Japan and Thailand. In Japan, the retailers do not wish to have warehousing adjointing their stores which leads to small deliveries and result in high transportation costs (DSIJ 1985, 216).

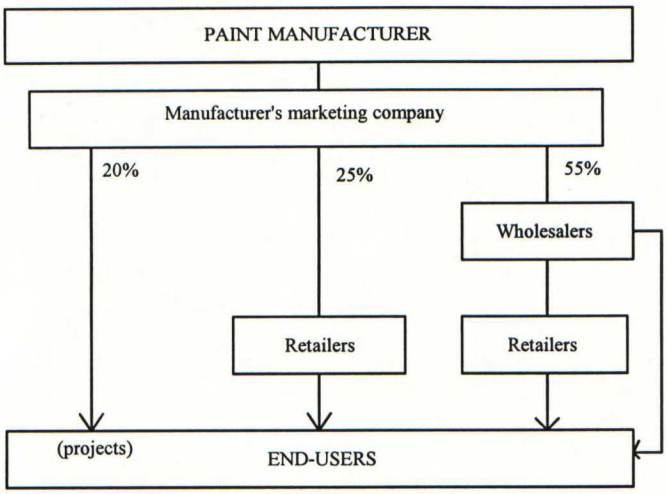
Figure 5.2: Paint distribution in Japan




Source: DSIJ 1985, 215

Paint distribution in Thailand is described in Figure 5.3. Paints are mainly delivered through a wholesaler which both resells to retailers and sells directly to customers, including normal end-users and heavy-users like construction firms.

Figure 5.3: Paint distribution in Thailand




Source: Vaarnas & Virtanen 1997b, 74

### 5.3.2 Manufacturers

In Japan channels are dominated by manufacturers which means that traditional retail stores usually offer one manufacturers' products. The manufacturer offers help with the trade and financing to other channel members, but on the other hand, the manufacturer can easily divert shipments away from a difficult retailer. Retailers have few if any options to develop alternative supplies, or to work away from their stores. (Fahy & Taguchi 1995; Johansson & Nonaka 1996, 143-147)

Manufacturers' dominance can be seen in typical practices of the Japanese distribution system. Keiretsu affiliations among firms can take the form of exclusive sales channel systems or sales agent systems, and refer to the sales networks organized by manufacturers to exclusively handle their own products (Ellram & Cooper 1993). A Japanese practise is returning the unsold merchandise from retail outlets to wholesalers, and from wholesalers to manufacturers. (AWO 1995, 31-32; Westney 1996)

In South-Korea, large manufacturers are commanding most distribution channels with their strong agency system, through which they have preserved themselves from price-cutting wars

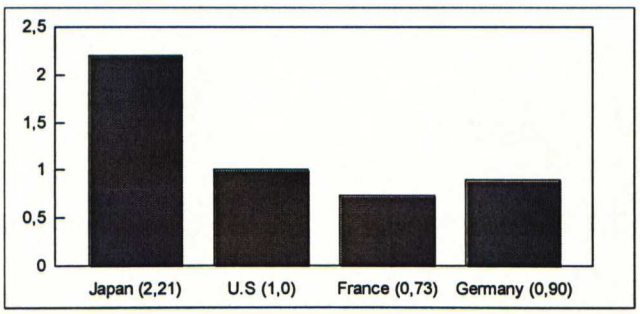
(Sohn 1996). In Thailand, manufacturers normally have their own marketing company which take care of marketing of all departments in the company. These companies may handle also competitors' products in some cases. By smaller manufacturers marketing unit is only a department inside the company. (Vaarnas & Virtanen 1997a, 58-78)

Concerning the size and number of paint manufacturers, there are about ten large paint manufacturers which dominates the markets in each country and many small ones, with less than ten employees. Many paint manufacturers in the Southeastern Asia are subsidiaries or joint ventures of European or Japanese multinationals which means to a system supplier that decision making unit may locate in head office in Osaka, not in national subsidiaries. Instead, in Thailand and Philippines the local independent manufacturers are strong. (Yamamoto 1996; AP 1997, 4) It is to be expected in South-Korea that the industry will become more rationalized and concentrated in the coming years, with many of the small and medium-sized companies disappearing from the scene. (AP 1997, 112-136)

### 5.3.3 Wholesalers

Figure 5.4 shows the number of wholesale layers in Japanese distribution channel in the 1980's. As retail stores in Japan are too tiny to keep extra inventory, the retailers order only small quantities of goods from manufacturers almost daily. To handle all these transactions and shipments, secondary and tertiary wholesalers have evolved, and are linked to manufacturers through other larger distributors. Many wholesalers own little more than a delivery truck and a ledger as assets. (Thornton 1994)

Figure 5.4: Average wholesale layers in Japan in the 1980's




Note: Germany = Western Germany

Source: Hirao, interviews (MITI)

One of every five Japanese workers is employed by either a wholesaler or a retailer, and most of these businesses have fewer than ten employees. To protect these jobs, there have been many retail regulations. Addition to these regulations, tradition also weighs heavily against change. Many retailers who would have the possibility to buy directly from factories prefer to get at least some of their stock from their usual wholesalers. The reason for this behavior is to preserve old business relations, even old school friendships. (Thornton 1994; Karppinen-Shetta 1997)

In recent years, many traditional functions of Japanese wholesalers have been carried out by other firms than wholesalers. For instance, large manufacturers, large retailers, and sometimes even large transportation and warehousing companies, have been moving into the wholeselling business. Their entries have diversified the range of distribution channels that exist in the marketplace, making it appear more complicated. Small wholesalers are reorganized into large groups and are striving to make their operations more efficient by reducing the number of items they handle, and by integrating their distribution centers. Being under pressure to respond to diversifying consumer demand, most have adopted segmentation strategies with aim of targeting very narrow market niches, concentrating their sales efforts on key customers. (AWO 1995, 32-41)

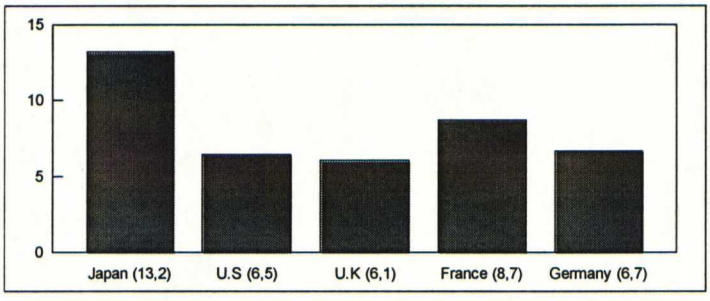
In South-Korea the role of wholesalers is quite minor, because most producers deliver goods direct to retailers (Astikainen 1995, 15). In Thailand, manufacturer's marketing companies act as wholesalers in many cases. Wholesalers mainly exist on regional basis, sometimes large retailers act wholesalers to small retailers. (Vaarnas & Virtanen 1997a, 74-75)

Changes are also taking place in Malaysia where a large number of smaller wholesalers must put their resources together to survive in competition. Many retailers traditionally have obtained their supplies from a large number of wholesalers, an outmoded system that involves mounds of paperwork. New distributors provide "one-stop wholeselling" by sourcing directly from manufacturers and supplying directly to retailers. These distributors are often nonexclusive because they represent competing brands and supply to competing retailers. (DIM 1996)

### 5.3.4 Retailers

Figure 5.5 indicates that Japanese retail stores are small. Most retailers are family owned and handle only a single line of goods. Many are affiliated with a primary supplier or a specialized wholesaler that provides advertising, and inventory financing, as well as most of merchandise. In return the retailers strictly observe suggested prices. (Thornton 1994)

Figure 5.5: Retail outlets per 1 000 people in the 1980's




Note: Germany = Western Germany

Source: Hirao, interviews (MITI)

A typical South-Korean retail store has less than two employees, with floor space $10m^2$ or less. Furthermore, the annual average sales is just about US$ 77,000 per store. The limited size prevents any innovation in management of marketing systems. (Sohn 1996) The most common retail type in hardware goods is a small independent speciality store which does not belong to any retail chain. These small retailers are named "Interior Decoration Specialist Companies" taking care of everything concerning decoration, including selling and also installing. (Astikainen 1995, 15) The hardware stores are usually concentrated in some areas, for example there are hundreds of stores in Seoul, including as well as small speciality stores as hypermarkets where almost every article concerning decoration can be found at the same place. The major trends in retailing are mini department stores and restricted right to represent more than one manufacturer. (Vaarnas & Virtanen 1997b, 64-65)

Chinese retailing system in Southeastern Asia accomodate a large number of small-scale, under-capitalised dealers and merchants (Gosling 1983, cited by Hodder 1996, 82-83). Retailers are mainly small village general stores. Other types of retail outlets include the growing number of supermarkets and hypermarkets, department stores and general hardware

stores. (AP 1997, 75) In Thailand, retailing of hardware goods has been regionally centralized and specialized. Retail chains are uncommon which means that retailers negotiate direct with manufacturer's marketing company. Many retail stores are family businesses with small inventory, and assortment includes one or two basic products. These street houses are used by small contractors and consumers. The stores are quite primitive and the size is normally between 20 and 40 square meters, but they are full of products. There are also large retail stores in Thailand. The size of these cash-and-carry outlets varies between 200 and 500 square meters. The main customers of these stores are small and middle-sized construction firms. (Vaarnas & Virtanen 1997a, 75)

The major trends in Asian retailing according to International Research Limited are the growing importance of supermarkets and, in some countries, specialised DIY superstores. The main changes in Japanese distribution include increased concentration of retailers, growth of discounters and increasing pressure on wholesalers. The traditional system is claimed to be complex leading to high prices (Okamoto 1980, 57). The growing tendency of retailers and manufacturers is to bypass wholesalers. Retailers have increased their purchasing power as they have expanded their retailing chains and increased the number of large stores. Discount store concept is an example of changes in retailing (DSC 1995). In the past many manufacturers refused to do business with discount stores, forcing the latter to purchase their inventory from cash-and-carry wholesalers. Recently, however, an increasing number of national brand manufacturers is doing business with the larger discount store chains. (Jones & Kouyoumdjian 1993, 6; Fahy & Taguchi 1995)

South-Korean distribution sector opened its door to foreign investment in 1996, when almost all legal regulations on foreign access to Korea's retail sector were lifted. The partial opening of the distribution sector in 1994 induced modernization in the structure of distribution, including a predistroying boom. Most Korean retailers are concerned about the effects of the market liberalization, because they are small and inefficient family-concentrated operations, whereas foreign multinationals rushing into the Korean market have a good marketing know-how with effectively computerized and standardized operation systems. They can achieve economies of scale by buying goods in bulk and selling them at lower prices. Besides, they can even develop their own low-priced brands. (MROK 1994, 24-26; Sohn 1996)

In Thailand the change is first occuring in Bangkok. In the 1990's a few large hardware stores in Bangkok have been established and they have begun to act as retail chains by establishing new stores. The assortment in the stores is broad, and customers are mainly normal consumers, not construction firms. So, in that sense they are quite close to DIY concept. The main advantage to customers in the stores is to get all products at the same place. As already mentioned, in Bangkok visiting many stores would take time because of traffic problem. (Vaarnas & Virtanen 1997a, 74-89)

In Malaysia, retailers cooperate with distribution companies in order to add distribution expertise to their retailing abilities. Number of large stores, so-called hypermarkets, is increasing because they can achieve competitive advantage by using advanced inventory control systems that allow them to keep stock to a minimum and overheads low. (DIM 1996)

**DIY Stores**

In a large extent DIY stores exist only in Japan with approximately 3150 stores. DIY-sector in Japan is still small compared to Western countries, accounting for only 7% of Japanese architectual sector paint consumption in 1994, but it is seen as an area for significant growth in the future. Japanese DIY superstore, or rather home centre, is defined as "a store with a floorspace of at least 330 $m^2$ and a comprehensive and systematically structured range of products for the household and everyday living". The selection of products available in DIY stores is correspondingly varied, the emphasis is rather on the home-making than on the construction aspect of the DIY concept. Paint has a 1,5% share of DIY sales volume. (WPF 1996, 271; JDIY 1996)

Table 5.2: The average DIY superstore in Japan

| | |
|---|---|
| Floorspace | 1759$m^2$ |
| Sales | 8,44 Mio US$ (1059 Mio Yen) |
| Gross margin ratio | 25,8% |
| Net profit ratio | 3,6% |
| Sales per customer | 226 US$ (2840 Yen) |

Exchange rates used: 1 US$ = 5,4713 FIM; 1Yen = 0,04361 FIM
(Central Bank of Finland, 29.1.1998)

Source: JDIY 1996

There are two basic trends in case of new DIY outlet openings: movement towards large-scale stores, and decreasing importance of regional orientation. Table 5.2 suggests that the average floorspace in Japanese DIY superstore is growing. Whereas the average floorspace of new outlets amounted to just under 2000 $m^2$ until quite recently as in table 5.2, it has now risen to 3300 $m^2$. The reason for this trend is the decreasing statutory regulation concerning the establishment of large-scale commercial outlets. (JDIY 1996; Dähne 1997)

### 5.3.5 Channel Relationships

The Japanese distribution system is based on the assumption that business relationships are long-term and continuous. One example is the rebate system. In Europe, rebates are often paid on each sale, while in Japan, they are usually paid at the end of a given period. (AWO 1995, 31-32) In recent years, manufacturers and retailers are beginning to form equal relationships, partnerships. Many of the manufacturers have been engaged in painful restructuring during the 90's and are not in a position to implement further cost reductions. Another reason for increased cooperation is that manufacturers are no longer capable of following diverse consumer needs on their traditional sales practices. To solve this dilemma, they are working with retailers to develop products that reflect retailers' needs and supplying these products in large volumes to a small number of retailers, thereby lowering distribution costs and slashing overall costs. (MRA 1995)

Many large manufacturers have their own distribution channels in South-Korea (Astikainen 1995, 15). In Thailand many manufacturers have partial ownership in retail stores. The impact of vertical integration on retailers' actions is that they often acquire only one manufacturer's brands in the product category. (Vaarnas & Virtanen 1997a, 59-79)

## 5.4 Summary

Two common features in distribution practices can be found. First, manufacturers have been dominating in distribution channels. Second, the main part of the paint has been delivering through wholesalers. A reason may have been the disparity and small size of retailers. Both the archipelagic nature and low level of infrastructure in addition to traffic problems can lead

to long delivery times especially in Indonesia, Malaysia and Philippines. Combined with small size of retail stores it increases the potential of manufacturing postponement.

In recents years, however, the increasing size and horizontal integration have given more power to retailers. This has caused difficulties to wholesalers. The cost awaraness and customers' increased demand has led to equal cooperation between channel members. It may help in taking full advantages of new developments in retailing, such as integrated colour mixing systems at point-of-sale.

This chapter suggests that wholesalers still have an important role in distribution in Eastern and Southeastern Asia. However, tertiary wholesalers do not seem to be common, which means that the comparison of postponement solutions can be performed using a retail and a wholesale level. On the other hand, both small and large retailers seem to exist, and thus all machines from small manual to large automatic ones should be included in the analysis.

# 6. Theoretical Framework: Impact of Form Postponement on Channel Members' Performance in Paint Business in Eastern and Southeastern Asia

Based on the discussions in previous chapters, normative theoretical framework is built. The purpose of the framework is to describe the performance factors in different postponement alternatives. As the study is performed from the system supplier's point of view, the final targetis to estimate demand for different postponement solutions.

## Postponement Alternatives

Postponement alternatives are based on two factors: postponement solutions and postponement levels. The postponement solutions in paint business are based on assembly and manufacturing postponement, which were introduced by Zinn and Bowersox (1988). In paint business, these two postponement types are called tinting systems and miniplant. The main difference between these types is the extent of final manufacturing. Assembly postponement solutions are further divided into manual and automatic machines.

It was found out in Chapter 5, that wholesalers play a major role in Eastern and Southeastern Asia. On the other hand, tertiary wholesalers do not exist in large extent. Thus, postponement solutions are analyzed at two levels, retail and wholesale level. As stated earlier, two other form postponement modes, label and packaging postponement, as well as postponement at the factory warehouse are excluded from this study. Moreover, miniplant is possible only at the wholesale level because of large investments required. On the other hand, capacity of manual machines is too low for wholesalers. Thus, the analyzed form postponement alternatives in paint business are:

- wholesale level: miniplant and automatic tinting machines
- retail level: automatic and manual tinting machines

## Potential of Postponement

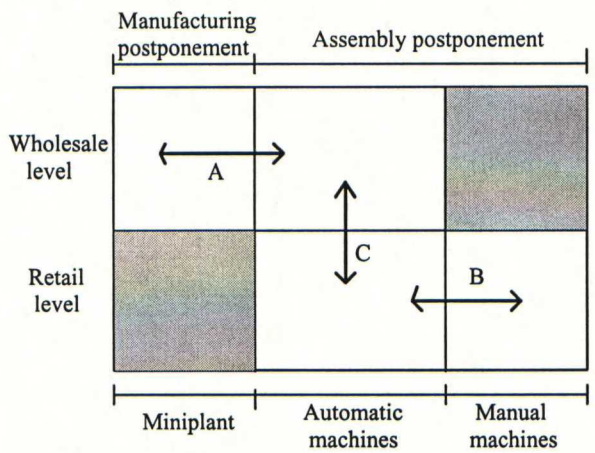
As discussed in Chapter 3, the factors that affect the potential of postponement can be divided into three categories: logistical factors, demand factors and product factors. Of logistical

factors, long delivery times and high demand fluctuations favor postponement implementation. As discussed in Chapter 5, in Southeastern Asia the delivery times in archipelagic countries are estimated to be long. Demand fluctuations affect both maximum capacity of postponement solutions and easiness of demand forecasting. With high product variety, expensive paints and high number of product introductions, need for postponement is urgent. Of demand factors, high price for customized products, in other words colour shades, favor postponement (see Hart 1996).

**Performance Analysis**

Evaluation of postponement solutions is performed separately in both channels. In distribution through wholesalers to retailers the analyzed issues are: miniplant versus tinting systems at the wholesale level (a), automatic and tinting machines at the retail level (b), and postponement at the retail versus wholesale level (c). In direct distribution from a manufacturer to retailers only the second issue (b) has to be analyzed.

Figure 6.1: Three comparisons




As discussed in Section 3.3.4, performance factors can be divided into three categories: investments, cost economies and marketing values. In Chapter 4, the performance factors in manufacturing and assembly postponement in paint business were further analyzed. As with an analysis based purely on verbal descriptions, it is difficult to give normative recommendations, calculations of the performance factors have to be made. The analysis is based on the reformulated definition of form postponement: "the strategy of delaying product

differentiation as late as possible provided that it creates additional benefits for each participant". In other words, if channel members were independent, each member should obtain additional benefits.

It follows that, system *investments*, including a colour processing equipment and a colour display, are paid at the point of product differentiation. Of *cost economies*, extra cost of colourants is paid at the point of product differentiation. Cost of colour cards belong to paint manufacturer's increased marketing costs. Inventory reductions can be received at the point of product differentiation and by preceeding channel members. As discussed in Chapter 4, manual machines cause some extra work compared to other alternatives and thus an additional cost for its use is calculated. *Marketing values* consists of many factors, for instance mass customized colour shades, which according to Pine II (1993, 47) should allow a price increase.

Figure 6.2: Formula for performance analysis

| | | Impact | Manufacturer | Wholesaler | Retailer |
|---|---|---|---|---|---|
| Investments | * Equipment | - | | A | B |
| | * Colour display | - | | A | B |
| Cost economies | * Use of colourants | - | | A | B |
| | * Colour cards for customers | - | X | | |
| | * Inventory reductions | + | X | X | B |
| | * Increased working duties | - | | | (B) |
| Marketing values | * Price increase based on customers' choice | + | | A | B |

A = wholesale postponement, B = retail postponement, X = in both cases, (B) = only in manual machines

The factors that cannot be measured on general level, are concluded in Figure 6.3.

Figure 6.3: Other factors in performance evaluation

| | | Impact | Manufacturer | Wholesaler | Retailer |
|---|---|---|---|---|---|
| Cost economies | * Freight costs | + | X | X | B |
| | * Scale-economies in production | + | X | | |
| Marketing values | * Service level improvement | + | X | X | B |
| | * More space for other articles | + | x | x | B |
| | * New product lines possible | + | X | "X" | "x" |
| | * Large sales/service network for immediate deliveries | + | X | | |

For instance, high service level can both decrease the out-of-stock costs and improve customer satisfaction which may lead to higher sales levels. However, these relations are difficult to estimate. In general, if the paints are delivered directly from the manufacturer to the retailer, the wholesaler can be excluded from the analyses.

A factor that makes differences between the different postponement alternatives is the inventory reductions. In the formula, inventory reductions depend on the complexity ratios (see Vepsäinen 1995, 11). The inventory reductions are based on the use of standardized components. Broader the assortment, higher the advantages of postponement. In manufacturing postponement the inventory reductions are higher than those of assembly postponement. The first issue in every analysis is to estimate a typical assortment based on the target country conditions. The example in Table 6.1 illustrates the situation. The factors that influence inventory costs are discussed in detail in the next paragraph.

Table 6.1: Example of inventory reductions

| Assortment | Miniplant | Tinting | Traditional | | => Complexity | Ratio | Square root |
|---|---|---|---|---|---|---|---|
| Can sizes | | 4 | 4 | | Trad.-tint. | 1200/120= 10 | **3,16** |
| Product types | | 10 | 10 | | Trad. vs miniplant | 1200/15= 80 | **8,94** |
| Shades/bases | | 3 | 30 | | Tint. vs miniplant | 120/15= 8 | **2,83** |
| Gloss levels | | 1 | 1 | | | | |
| **Total** | **15** | **120** | **1 200** | | | | |

**a) Manufacturing Postponement versus Assembly Postponement**

As metioned, the main difference between assembly and manufacturing postponement is the extent of postponement. In paint business this means that in addition to the colour shade also gloss level, product type and can size decision can be postponed. Thus, the inventories with miniplant are smaller. On the other hand, the investment cost of this solution is remarkably higher than that of the tinting systems. Because of the large investment and a lot of space required at the outlet only the wholesale level is appropriate for miniplant. For this reason, tinting systems and miniplant can only be compared at the wholesale level.

The inventory reductions of miniplant are significant only if there is a need for high stock levels. Thus, any factors that cause stocks, for instance demand fluctuations and long delivery times, favor the miniplant solution. As discussed in the previous chapter, the delivery times in archipelagic countries, Indonesia, Malaysia and the Philippines, can be longer than in the other countries. The inventory reductions in the model depend on the following factors: assortment, interest rate (%), deliveries through a warehouse, number of warehouses, paint price for paint to the owner and the present inventory levels.

**b) Assembly Postponement - Manual versus Automatic Machines**

In postponement in retail level, the main question is the choice between manual and automatic systems. In many cases, the capacity of manual machines would be sufficient enough. Nevertheless, also other factors influence the decision. As automatic systems represent high-tech compared to manual ones, image factors favor automatic machines. Another negative aspect of the manual machine is that it is quite time-consuming to use. Thus, manual machines might be a better solution in countries where the extra work does not cost very much, for instance in Southeastern Asia.

**c) Postponement in Retail versus Wholesale Level**

As mentioned in the theoretical part, postponement in distribution channel can be implemented both at retail and wholesale level. Thus, they are not necessarily exclusive. The implementation is often performed in phases, in other words, colour processing systems are first acquired at the factory warehouse. After a few years, the manufacturer may start to look for new ways to utilize the potential of the new production method and will discuss with distributors. Postponement levels available in distribution through wholesalers to retailers are: wholesale level, both wholesale and retail level, and retail level. If many wholesalers in target countries had direct sales to end-users, tinting only by the retailer would be unrealistic.

*In postponement at wholesale level* the wholesalers deliver the tinted paints to the retailers in advance or to order. The wholesaler carries all costs but also gets the possible profits. Of paints sold to end-users through retailers it receives the retail price and of direct sales to

end-users the wholesale price. In this alternative retailers obtain a capability to sell thousands of colour shades with a few days delivery times.

*In postponement at retail level* the wholesaler continues to use the system but also retailers acquire a machine. Thus, retailers begin to carry the costs but also start to get the advantages, the reduced inventories and price increases. After implementation of retail postponement, the wholesaler uses the system solely to direct sales. The purpose of the analysis is to define the conditions under which retail and wholesale postponement are appropriate solutions. The sales increases or better margins due to shift to high-end products are not included in the model. They have to be discussed separately.

**d) Total Performance Analysis**

In this section, the results of three comparisons are put together. The performance factors other than the numerical ones are also taken into account. The purpose is determine the ranges in which each postponement solution would be profitable. Of course, some solutions may not be profitable at all in some countries.

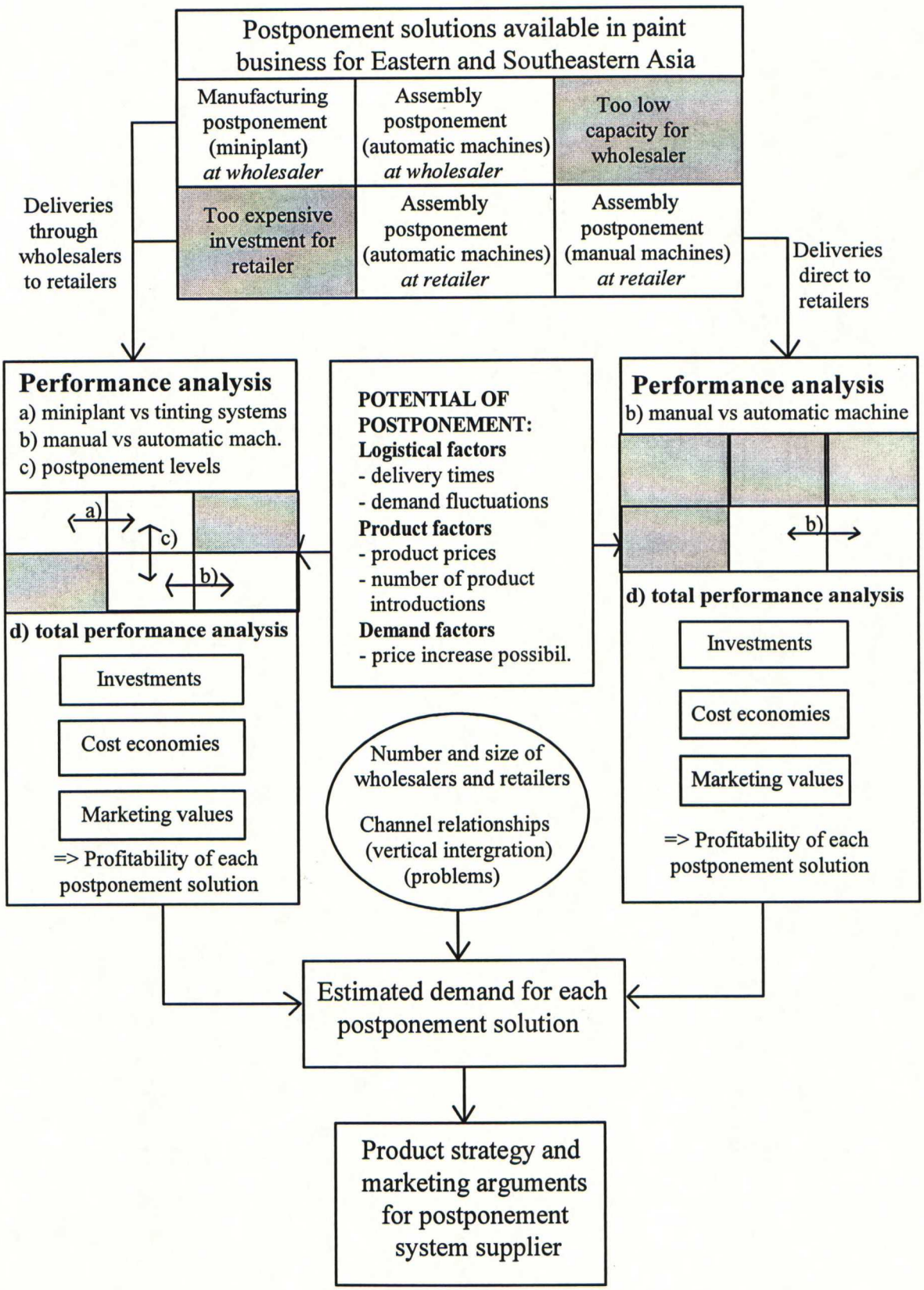
**Estimated Demand for Different Postponement Solutions**

First, number and sizes of wholesalers and retailers should be known. Also present channel relationships should be analyzed. If vertical integration exists, instead of profits of each channel member total impact be calculated. On the other hand, problems in cooperation may prevent implementation of some alternatives (see Zinn 1990). Because of the manufacturers' produces the base paints, they have a key role in the beginning. It follows that manufacturers' motives have to be taken into account in evaluation of different postponement alternatives.

**Product Strategy and Marketing Arguments for Postponement System Supplier**

Based on the demand for postponement solutions and the present strategy, recommendations for the product strategy in Eastern and Southeastern Asia is given. Also some marketing arguments are discussed. The normative theoretical framework is illustrated in Figure 6.4.

Figure 6.4: Impact of form postponement on channel members' performance in paint business in Eastern and Southeastern Asia



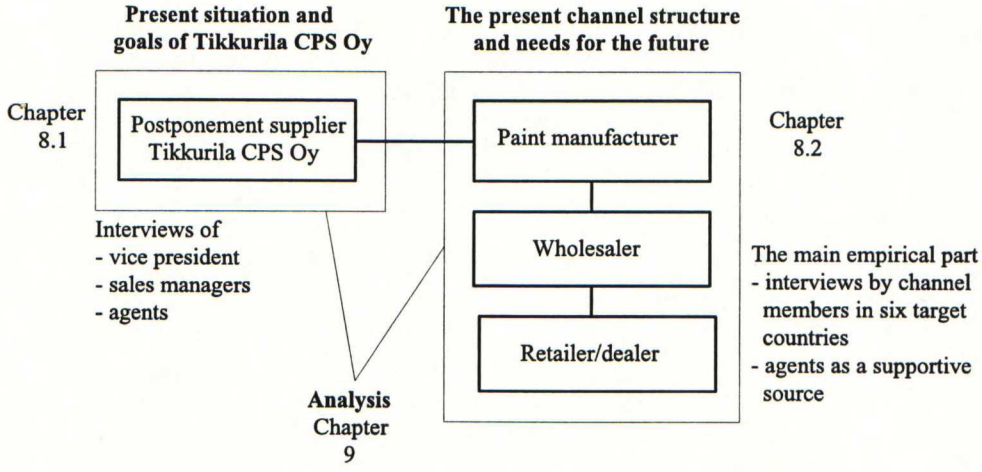
# 7. Methodology

The aim of this chapter is to introduce the research approach and describe how the empirical part of the study was conducted. This chapter begins with presenting the research approach, followed by description of data collection and analysis. The chapter concludes with a discussion on validity, reliability and limitations of the study.

## 7.1 Research Approach

The main purpose of the empirical part is to analyze the potential of different postponement solutions in Eastern and Southeastern Asia based on the normative theoretical framework. The study is categorized as normative, because the purpose of the study is to find an answer to a specific managerial problem (Kasanen et al 1991). However, it also includes some descriptive and constructive parts. For instance, both parts in Chapter 8 are descriptive because a general picture before the analysis is given. On the other hand, the analysis phase in Chapter 9 includes many constructive parts, for instance a categorization of postponement solutions on country level. The structure of the empirical part is described in Figure 7.1.

Figure 7.1: Structure of the empirical part




First, the present situation of the postponement supplier, Tikkurila CPS Oy, is discussed. Its postponement solutions and their present penetration rates, in other words already installed

systems in distribution channels, are described. As a postponement supplier Tikkurila CPS Oy suits well for the research purposes of this study because it supplies systems in all sizes, from manual machines to miniplant and fully automated tinting lines.

In the the second part of Chapter 8, based on the factors of the theoretical framework an overview of the channel structure is taken, including the importance of different distribution channels and the sizes of retailers and wholesalers. In addition, the logistical, demand and product factors for evaluating the channel members' performance are analyzed. Finally, a few constraining factors are taken into account.

In Chapter 9 the suitability of postponement solutions is first analyzed in three different ways: differences between manufacturing and assembly postponement, differences between manual automatic systems, and postponement levels. The alternatives are evaluated in three performance categories: investments, cost economies, and marketing values. Based on the performance and constraining factors, demand for the postponement solutions is estimated. Finally, the recommendations and marketing arguments for the postponement system supplier are given. The empirical part includes the same six countries as the the theoretical part, because the knowledge of one country does not give a feasible backround for strategic decisions, especially in Asia, because countries may differ greatly from each other.

## 7.2 Data Collection

Qualitative research is an unstructured, exploratory research methodology based on small samples that provides an insight and an understanding of the problem setting (Malhotra 1996, 164). Qualitative research creates the theory instead of just testing it (Uusitalo 1991, 81). It suits for this study because there is not very much information available about paint distribution in Asia. The list of questions is quite long, and the time required for one interview is about two hours based on the theme discussions. The questionnaire can be found in Appendix 7.

The information gathered can be divided into two main parts based on the theoretical framework. First, data from the postponement supplier's targets and knowledge were collected

in tape recorded personal interviews of sales managers and executive vice president in the Vantaa head office. Nevertheless, the main survey was performed in six countries using the questionnaire. The collection of this data is next discussed in detail.

In qualitative research the researcher often makes the interviews himself. However, making interviews in six countries with manufacturers, wholesalers, and retailers would not be a practical solution because of two reasons. First, it would be unrealistic to assume that all channel members in six countries would fluently speak English which is the requirement in interviews made by the author himself. Second, local people may be reluctant to give information to foreigners who they do not know. In the contrary, the agents already have contacts in the paint business and can speak the local language.

The interviews in Thailand were made by the author. Agents of Tikkurila CPS made interviews in South-Korea, Malaysia and Philippines. In Japan and Indonesia the survey were performed in cooperation with Finnish Trade Center. The agents are familiar with the paint industry having already a big picture over the markets. On the other hand, representatives of Finnish Trade Center are used to do market surveys and they have a very professional attitude. For instance, in Indonesia the commercial assistant took pictures of the stores he visited. Names of the interviewers can be found in Appendix 8.

Thus, the data collection was performed in the team of five persons. Close cooperation with other channel members has its own advantages. According to Eisenhardt (1989), an advantage of multiple interviewers is that they improve the creative potential of the study. Team members tend to have complementary insights and different perspectives which add to the data and enhance the likelihood of still discovering new insights occuring in the interview information.

The numbers of the performed interviews in each country are concluded in Table 7.1. The interviews were made with different-sized of manufacturers, wholesalers and retailers, exception to this is Thailand where an interview was made with the local specialist. In addition to the interviews some information is based on the report the specialist had made of paint markets in 1996 in Thailand. The advantage of manufacturers as interviewees is that

they have the overview over the distribution channels. On the other hand, wholesalers and retailers often have closer touch to needs of end-users. The contact persons in the case companies received small gifts from the interviewers because of the motivation purposes.

Table 7.1: Number of interviews in target countries

| | Japan | Korea | Indonesia | Malaysia | Philippines | Thailand | Total |
|---|---|---|---|---|---|---|---|
| Manufacturer | 1 | 3 | 2 | 2 | 2 | 1 | 11 |
| Wholesaler | | 3 | 3 | 1 | 1 | | 8 |
| Retailer | 3 | 3 | 3 | 1 | 1 | | 11 |
| Other | | | | | | 1 | 1 |
| **Total** | **4** | **9** | **8** | **4** | **4** | **2** | **31** |

The survey was confidential. Thus, the company names are not disclosed. However, the nature and size of the companies are described when relevant. The confidentiality was important because otherwise many issues might have been classified as business secrets.

The interviews in Thailand gave to the author a personal touch to the markets. In addition to interviews also a few paint stores were visited. The author also met the local agent in Malaysia, discussing about the implementation of the survey there. After this trip a few extra questions and further instructions to the other interviewers were given.

**Questionnaire**

The questionnaire consisted of 6-7 pages including a cover page and four common pages to every channel member. The sixth page was different to each channel member because these questions concern channel relationships and connections from each channel members' point of view. The seventh page was only for archipelagic countries, namely Malaysia, Indonesia, and Philippines, concerning the deliveries to islands. The tight design with standardized questions in the questionnaire was chosen because of many interviewers (see Jyrinki 1977, 8). The tighter designs also provided clarity and focus by avoiding diffuseness and overload (Miles & Huberman 1994, 17). The standard questions helped to obtain an overview from every country.

Because the understanding the channel structure was the basis of the analysis, a few additional questions about some special issues in the channel structure were afterwards asked to ensure the correct conclusions. Agents and other interviewers also gave their own comments based on their own experience when asked. The author has explained the points in the questionnaires to interviewers in letters, faxes and also in telephone if necessary. This way misunderstandings were tried to be avoided. The questionnaire was written in English, exception to this being Japan where also the questionnaire was translated into local language. The questionnaire was carefully drawn up including the correct spelling of English. The agents asked the questions using their own native language.

The questionnaires were sent to target countries in the end January and most of the interviews were performed by 15th March and the rest by 21th April, 1998. The interviews in Thailand were made in the middle of February 1998.

## 7.3 Data Analysis

In Section 9.1, the potential of different postponement solutions is analyzed based on the information of Chapter 8. According to theoretical framework, the three main comparisons in the analysis are: assembly versus manufacturing postponement, manual versus automatic machines (assembly postponement), and postponement at retail versus wholesale level. The factors in the analysis were already described in theoretical framework in Figure 6.2. The detailed calculations can be found in Appendix 10.

The advantage of the analysis method introduced in the theoretical framework is that it is clear and simple, including the main factors. The disadvantages include normal EOQ assumptions and the excluded factors. For instance, the calculations do not take into account sales increases and different sales of different articles. Also, colourant inventory levels are not calculated.

The calculations are based on the average figures in target countries, but the relation of each country to the average situation is described. The purpose of the analysis is to give suggestive

results which are computed by the factors which are not taken into account in the calculations, as described in Figure 6.3.

## 7.4 Validity and Reliability

According to Grönfors (1982, 178) the only way to guarantee the validity in qualitative research is to describe the research process in detail. Gummesson (1988, 53) argues that it is vital for an academic researcher to have worked within a company which is the situation in this study as already mentioned in the introduction. The personal experience has given possibilities to understand the business practices of the postponement system supplier.

The researcher has to maximize the following four aspects of the quality of any design: construct validity, internal validity, external validity and reliability (Yin 1989, 27). With these aspects the researcher can test a logic of different statements.

1. *Construct validity* in data collection phase can be reached by establishing correct operational measures for the concepts studied, which is done by the following three tactics. Firstly, validity can be reached by using multiple **sources of evidence** in data collection which make any finding or conclusion more convincing and accurate (Yin 1989, 95-97). In this study, the problem was solved in the following way. To begin with, the author took the general view on the issues already in theoretical part using all different sources available: surveys, interviews, etc. In addition, the author visited himself in the Southeastern Asia doing many observations of wholesale and retail outlets in addition to the interview with a manufacturer. The technical point of view was received by discussing with a chemist of Tikkurila CPS Oy responsible for colourants applications in Asia.

Secondly, the reliability of the information can be increased by maintaining **a chain of evidence** which allows the reader of the study to follow the derivation of any evidence from initial research questions to ultimate conclusions and backwards (Yin 1989, 102). Despite of the fact that the names of the case companies target countries can not be published, their nature including home country and size are described when relevant. The backround of general statements in company-level can be found in Appendices.

The third validating procedure to be followed is related to the overall quality of the study. The procedure is to have the draft report reviewed. The possible corrections of the interviewees will enchance the accuracy of the study (Yin 1989, 144-145). In this study the unclear answers was asked direct from interviewees or from interviewers to ensure that the key point were obtained from every source. After the completion of the data analysis and writing the whole empirical part, a preliminary version was sent to the supervisor in Tikkurila CPS Oy, Mr Aulanko, for a possible feedback. Based on the comments, some minor corrections were made.

2. The second tactic is *internal validity* which refers to data analysis phase. The problem of developing internal validity in the case study lies on establishing a causal relationship between explained events. (Yin 1989, 40-43) According to Seppälä (1997) internal validaty or credibility means a finding of common themes and differences along the research. In this study a general view both in country and area level was the main purpose. Thus, many common statements are used but the differences between countries are explained.

3. The third tactic, namely *external validity* or transferability, deals with the problem of knowing whether the study's findings have larger significance in overall context (Seppälä 1997). In selection of manufacturers, one of the criteria was representativeness of different sizes because the size of manufacturer affects the length of the distribution channels, as discussed in the theoretical part. As can be seen in Table 7.1, in Malaysia, Philippines and Thailand, the information received from the manufacturers was the main source which was taken into account in the analysis phase. Basically, as the survey and factors used in the analysis are based on general facts of the industry, the results are valid in paint and colour processing industry. For instance, many postponement solutions can also be found by most of the competitors' product range.

4. The final test to judge the quality of the research design aims at examining the *reliability* of the study. The aim is to ensure that another researcher, doing the study from the same subject again and following the same procedures arrives at the same findings and conclusions (Yin 1989, 45). Reliability in qualitative results can mainly be ensured by discussing with the outside experts (Seppälä 1997). The following actions have been taken to ensure the reliability

of this study. First, the difficult issues were discussed in addition to interviewers also with sales managers of the company. Second, the data collection and analysis procedures as well as theoretical framework are carefully described. In addition, all evidence, informal and formal, is clearly documented in order to make the study as reliable as possible.

To conclude, when analyzed on the basis of four tests mentioned above, this study meets the requirements of validity and reliability.

## 7.5 Limitations

In many countries there were difficulties in getting interviews from retailers and wholesalers. In this respect, the interviews were best performed in Indonesia and Korea because sufficient information from all levels were received. Thus, the information from these countries can be considered more reliable than from other countries. In Japan a special problem was the reluctance to give estimations in numerical form. A reason for this might be the culture because the Japanese people fear to lose their face if they answer incorrectly (Karppinen-Shetta 1997).

As discussed in the theoretical part, taking all variables for performance evaluation is not possible because many factors depend on company-specific issues. A special issue is miniplant which is not yet a selling article, in other words, it is known only as a concept. It can be argued that it is not wise to take this kind of pilot to academic writing at all as literature from this subject does not exist and the author has to rely on interviews. On the other hand, being the first in this subject is a major point itself. Thus, the partial constructive nature is required for giving the blocks for the analysis of a totally new issue.

Furthermore, the general statements in the numerical form in the eighth chapter may not be accurate because they do not based on quantitative methods. However, the issues were asked in different ways and thus a general picture can be given. The figures of different countries are not put together because the size and importance of countries varies and a lot of information would be lost. One constrain is that no difference between the size of retailers who order paints direct from manufacturer or through wholesalers was made.

# 8. Postponement System Supplier and Distribution Channels in Eastern and Southeastern Asia

This chapter consists of two parts. First, systems and goals of the postponement supplier, Tikkurila CPS Oy, are discussed. In addition, an overview of distribution channels in Eastern and Southeastern Asia is taken. This chapter is descriptive, the analyses are performed in the next chapter.

## 8.1 Supplier of Postponement Systems: Tikkurila CPS Oy

In this chapter the Finnish postponement system supplier, Tikkurila CPS Oy, and its goals in Eastern and Southeastern Asia are described. Also a broader aspect of the company's strategies in Asia is taken to be able to give recommendations at later stage.

### 8.1.1 Company Description

At the beginning of 1997 the Tikkurila Group, a subsidiary of the large chemical group Kemira Oy, was divided into three main business operations units. Tikkurila CPS, the case company, produces and sells colour processing systems, Tikkurila Paints decorative paints and Tikkurila Coatings industrial coatings. The most international and dynamically growing sector of Tikkurila's business operations is colour processing systems. Factories acquired in Italy made Tikkurila the world's leading company delivering advanced automatic tinting systems. As a colourant supplier Tikkurila is the second biggest in the world. (Järventaus 1997)

Tikkurila's tinting systems, which were created through the company's own research and product development, have been sold to almost one hundred countries. Fast-growing areas are South-America, the Middle East and Asia, where breakthrough is expected in the near future. The company has production units in the Netherlands, Australia, South-Africa, Italy, Finland, Uruguay and the United States. Moreover, it has sales companies in Brazil and Hong Kong. (Järventaus 1997; KAR 1998)

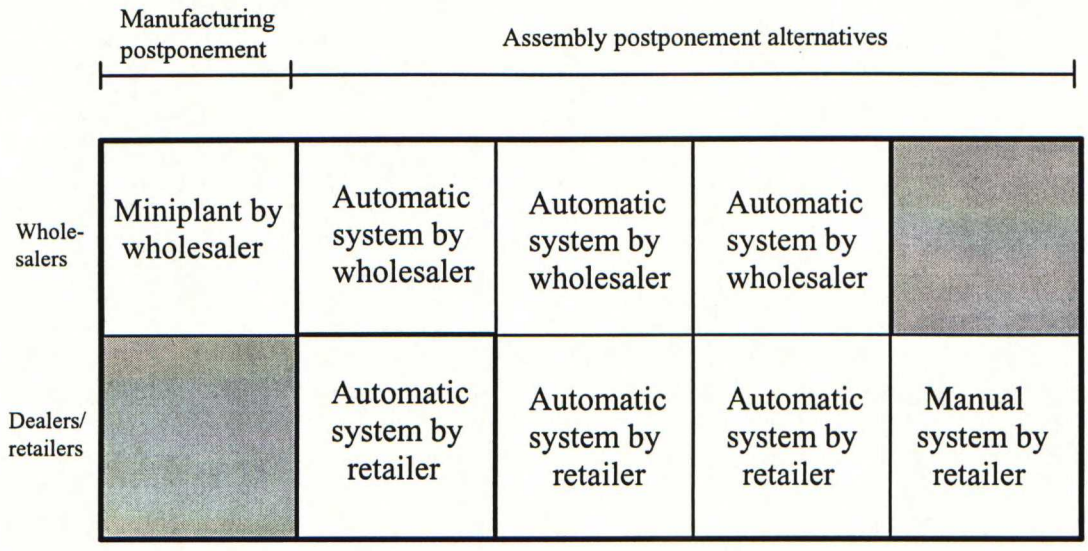
The case company is concentrated on the production of colourants but produces also pigment concentrates which are used in in-plant tinting. The concentrated pigments are typically cheaper but because of quality variations they do not suit for remote tinting, i.e. postponement solutions. Thus, they are excluded of this study. It does not mean that it would be an unconventional way to start the new kind of production. Actually, it is quite a popular production method in Australia and USA. Based on the discussions in Thailand and Malaysia, it could be an alternative to get paint manufacturers to the company's clients.

### 8.1.2 Postponement Solutions Available

As discussed in theoretical part, colour processing systems can be divided into three main categories: manufacturing postponement (miniplant), assembly postponement with automatic dispensing equipment and assembly postponement with manual dispensing equipment. As Figure 8.1 shows, miniplant is the most expensive alternative with the highest capacity. It is not yet a selling article, but the pilot is under construction.

As Tikkurila CPS is concentrated on automatic systems, there are three capacity alternatives available in this category. Manual systems are the cheapest alternative with lowest capacity. Actually, there is one alternative more in automatic systems, an fully automated tinting line, with capacity of 2,000,000 liters and price FIM 2,000,000. Thus, the capacity and price are even higher than in miniplant. Because the price is so high, it is normally used only at the factory warehouses. This also the main reason for excluding it because under normal conditions it is not a realistic alternative in retail or wholesale level. Next each selected solution is discussed in more detail from the smallest capacity to the biggest one.

Figure 8.1: Colour processing systems of Tikkurila CPS




| | | | | | |
|---|---|---|---|---|---|
| Annual capacity in liters | 1 000 000 | 300 000 - 500 000 | 100 000 - 150 000 | 60 000 - 80 000 | 15 000 - 50 000 |
| Canister size of colourants | >20 | 20 | 4,0 | 2,5 | 2,5 |
| Prices: | | | | | |
| Machine | 800 000 | 200 000 | 60 000 | 35 000 | 10 000 |
| PC | 5 000 | 5 000 | - - - *) | 5 000 | 5 000 |
| Mixer | 15 000 | 15 000 | 15 000 | 15 000 | 15 000 |
| **Total** | **820 000** | **220 000** | **75 000** | **50 000** | **30 000** |
| **US$ **)** | **150 000** | **40 000** | **13 500** | **9 000** | **5 500** |

*) Included in the price of dispensing machine
**) US$ 1 = FIM 5,5

Source: Tikkurila CPS Oy; Aulanko, interviews

*Manual machines.* The practice of Tikkurila CPS has been that manual machines have been sold when the customers have asked for them, but the focus of the company is on automatic machines. At the moment Tikkurila is losing its potential to sell manual machines because the machines are overpriced and old-fashioned compared to competitors' alternatives. The current price is about FIM 11,000 but it is planned to be decreased FIM 7,000 which would be about the same levels where the competitors' products are. At the same time, the machine may be modernized and simplified to some extent. Any electrical parts will not be included. In annual

level Tikkurila's sales of manual machines has been a few hundreds machines while a competitor, Fluid Management, has sold several thousands of machines and thus obtained the scale-economies compared to Tikkurila. The main point from Tikkurila CPS's point of view would be to know demand for manual machines in the future. As mentioned, one of the most potential markets is Eastern and Southeastern Asia. Manual machines do not bring itselves high profits because of low margins but as a system component it could be important.

*Simple automatic machine.* Simple automatic machine represents new technology. In capacity and price it falls between manual and normal automatic machines. An important point is that it is an automatic machine, not an automatized manual machine. This is a new product in Tikkurila's assortment and until today it is presented only to key customers.

*(Normal) automatic machine.* This has been the best selling article through the years. For example in Finland, it is widely used in hardware stores, even though the capacity of manual machines might be sufficient enough. A reason for acquiring an automatic system instead of manual one has been that high seasonal demand at summer time requires more capacity.

*Automatic machine with can transport.* The sales of this product are minor compared to the normal automatic machines. Nevertheless, this machine offers a good alternative when a large retailer wants to serve big customers quickly.

*Miniplant.* As mentioned, this product is under construction. As it represent manufacturing postponement, its advantages are higher when the wholesaler have high sales with huge buffer stocks. Because a reason for remarkable inventories is long delivery times, the numerous islands in Indonesia are estimated as a potential market of this product.

The agents of Tikkurila CPS and other interviewers do not know about the new products, simple automatic machine and miniplant. Hence, their evalution of potential of these products is not obtained. However, Tikkurila is especially interested in market potential of these products to be able to determine, for instance, a sufficient production capacity.

### 8.1.3 Present System Penetration and Goals in Asia

As Eastern and Southeastern Asia is only a part of Asia, first a broader view to other important countries in Asia is taken to get a sufficient understanding of the company's goals. As mentioned in theoretical part, penetration rates of colour processing systems in Asia are low. In the Middle-East and in India Tikkurila has sold many machines for use in retail and wholesale level. The same breakthrough in Eastern and Southeastern Asia is estimated to occur in 3-5 years. For this reason, the experiences from these countries are briefly discussed.

**Experience from Other Countries in Asia**

In India Tikkurila has sold over 200 automatic machines for retailers and wholesalers. The annual sales of one manufacturer's coloured paints were between 5,000 and 10,000 liters total sales being about 20,000 liters. So, capacity of manual machine would have been sufficient but automatic machines were chosen because they look more high-tech. The manufacturer wanted to show a big difference compared to a traditional way-of-action and thus put very much effort on marketing side. The manufacturer was a large medium-sized company which wanted to increase its market share. It had two options: either decrease its prices or acquire tinting systems and concentrate on high-end products. It chose the latter one. The manufacturer invested a lot of money in advertising campaigns and obtained the goal of a higher market share than before. Many new retailers have been interested to get the manufacturer's paints and system in their own store.

In Saudi-Arabia, 10 manual and 200 automatic machines have been sold by Tikkurila. Manual machines were delivered first but the customers were not satisfied with them because they did not look impressive. Thus, in later stage only automatic machines have been bought. Again, the cost calculations based on the size of the retailer were not the first condition, rather the marketing impact. The annual paint sales in these stores were 15,000 - 30,000 liters.

A rapidly growing market in Asia is China. The sales of retail stores are expected quite low which favor manual machines because of their lower price compared to automatic ones.

About other issues, Tikkurila concentrates on training the manufacturer's personnel so well that they are capable of training distributors. In some cases Tikkurila's technical staff have trained distributors, for instance in Saudi-Arabia. One of the important marketing factors in these markets was the establishment of service network before starting the active selling work because it was seen as a sign of Tikkurila's commitment in the long term. Also direct marketing of Tikkurila direct to retailers has fasten the process.

**Eastern and Southeastern Asia**

The machines sold to distributors in Eastern and Southeastern Asia are unique cases. Next the machines sold by Tikkurila and its some competitors are discussed.

In *Malaysia,* two manufacturers have enlarged tinting systems to distribution channel. One manufacturer uses Tikkurila-system with 14 automatic machines at wholesale depots. Another paint manufacturer has introduced tinting systems to 23 hardware shops. The system offered by Tikkurila's competitor is described in Table 8.1. Currently, the systems are under-utilized because market demand has been quite low.

Table 8.1: An automatic tinting system in hardware shops in Malaysia

| | |
|---|---|
| *Machine and colour display*: | Cost of machine US$ 16,000-18,000<br>Colour chart with 3,000 colour shades |
| *Paints available*: | 1) interior emulsion paint<br>2) economy interior emulsion paint<br>3) 100% water based acrylic exterior finish<br>4) high gloss finish for wood, steel & metal |
| *Customers:* | Designers, contractors, and do-it-yourself customers |
| *Price:* | - The highest price is about US$ 4,3/liter<br>- Price difference compared to normal paints about US$ 0.5 in dark shades (red and orange) and US$ 0.2 in lighter shades. |
| *Packing:* | 1 liter and 5 liters |

In *the Philippines,* there are a few active manufacturers that have started the base paint production but only one manufacturer has enlarged into the distribution level. Tikkurila has sold six manual and four automatic machines for retail outlets. In *Korea,* two automatic machines have been sold for wholesale outlets.

In *Japan,* the tinting systems mainly exist in wholesale outlets and large DIY stores, the major part of the systems being manual ones. The subsidiary of Tikkurila CPS Oy in Italy, Corob, has sold some small automatic systems. A problem is that many manufacturers have begun to produce colourants themselves and are mainly interested in buying machines from an outside supplier.

In *Indonesia* and *Thailand,* Tikkurila have not sold any machines for distributors' use. In Indonesia, only a few manufacturers and the big wholesalers in the same channels use tinting systems, exception to this being ACE retail chain where computerized tinting systems can be found.

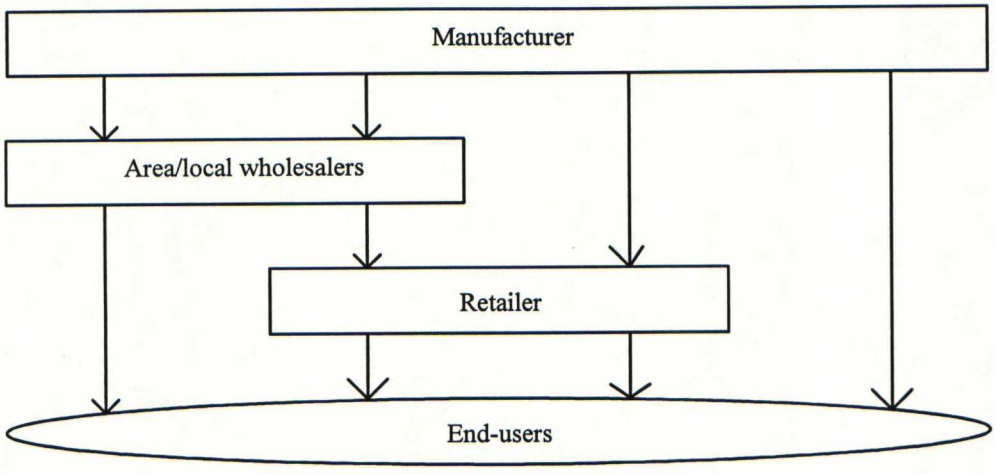
## 8.2 Distribution Practices in Eastern and Southeastern Asia

This section describes the distribution practices relevant for theoretical framework. The main purpose is to understand the general practices but sometimes a few case descriptions have been given to illustrate the situation. To begin with, importance of different distribution channels is discussed. Second, sizes of retailers and wholesalers are described. Third, logiustical factors are discussed. Fourth, product and demand factors are discussed. Fifth, a few cosntraing factors analyzed. Finally, channel members' plans for colour processing investments are discussed.

### 8.2.1 Channel Structure

A broad overview of importance of different distribution channels has been given in Table 8.2. The numbers in the table are mainly based on the manufacturers' descriptions because they have a broad overview of the channels. The share of wholesalers' direct sales to end-users has been taken into accoun. Manufacturers sometimes have their own distribution centers and warehouses in addition to wholesalers' ones. The use of warehouses depends greatly on the manufacturer and thus one general description in this respect is not possible.

Table 8.2: Shares of different distribution channels




| | | | | |
|---|---|---|---|---|
| - - | 80 % | 20 % | - - | Japan |
| 8 % | 2 % | 50 % | 40 % | Korea |
| 15 % | 30 % | 35 % | 20 % | Indonesia |
| 20 % | 25 % | 30 % | 25 % | Malaysia |
| 10 % | 10 % | 65 % | 15 % | Philippines |
| 25 % | 25 % | 30 % | 20 % | Thailand |

The numbers in the table are only illustrative because of small number of cases in every country. Nevertheless, the table suggets the importance of different distribution channels. For instance, in Korea the wholesalers have only minor importance. On the other hand, in Indonesia wholesalers play a major role because many retailers buy only from wholesalers. In Korea the wholesalers are large retailers which sell only 10-20 % of their paints to retailers. The numbers in the table depend on the size of the manufacturer. For instance, a medium-sized manufacturer in Thailand does not use wholesalers at all, but in general, the wholesalers are widely-used in Thailand. In Japan a large manufacturer sells only through wholesalers but it is planning to shift to direct deliveries to large retailers in the near future.

Channel members are usually independent, in other words, vertical integration does not exist. However, there are a few exceptions. For instance, in Korea some manufacturers have their own warehouse outlets. In Japan a big manufacturer delivers through five of its own area distribution centers which resell to hundreds of retailers. In Indonesia a small retail chain, Mitra 10, is fully owned by a wholesaler. In general, retail chains are not common in target countries, exception to this being Japan where many DIY-retail chains exist. In other countries

only retail chains of a few outlets and small buying groups exist. In Indonesia only two retail chains can be considered in a Western manner, ACE and Mitra 10, but they both have only a few outlets.

**Deliveries to Islands**

In three archipelagic countries, Malaysia, Indonesia and Philippines, islands play a major role in deliveries between channel members. In Indonesia the manufacturers deliver paints to 9 main islands and have their own warehouses on three islands. The deliveries through these warehouses are between 600,000 - 1,500,000 liters. Wholesalers are used on the smaller islands because the deliveries through the wholesalers are between 140,000 - 300,000 liters. According to one assumption there are more than ten paint retailers only on the 20-30 most crowded islands in Indonesia.

In the Philippines manufacturers deliver at least to five islands and have their own warehouses on three main islands. In Malaysia the interviewed manufacturers use agent's warehouse on Borneo island. Annual deliveries through the warehouse are between 1,500,000 - 1,800,000 liters.

**Number of Wholesalers and Retailers**

Looking just numbers of wholesalers and retailers in Table 8.3 may not tell the whole truth. For instance in Korea, wholesalers sell 85% direct to end-users and only 15% to retailers. Thus, Korean wholesalers are actually large retailers. The numbers are based on manufacturers' estimations and are the highest ones of all the answers. The numbers from Japan are received from the Paint Makers' Association. Of the total number of 6,300 retailers in Japan, about 4,300 sell only paints the others being hardware stores.

Table 8.3: Number of wholesalers and retailers in target countries

| | Japan | Korea | Indonesia | Malaysia | Philippines | Thailand |
|---|---|---|---|---|---|---|
| Retailers | 6 300 | 900 | 11 000 | 3 000 | 3 000 | 10 000 |
| Wholesalers | 2 400 | 100 | 200 | 50 | 20 | 300 |

Any major trend in the importance of retailers and wholesalers cannot be found. In Japan, the total number of retailers in Japan is estimated to decrease which might mean higher sales per store. In Korea, importance of wholesalers at least in the short run has grown, as many retailers went bankrupt in 1997. On the other hand, in Indonesia manufacturers' direct sales to retailers and end-users are nowadays accepted which has meant a decreasing importance of wholesalers.

In the Philippines a manufacturer is going to take more selective attitude toward channel members and penetrate more to the emerging markets like shopping malls, direct contracting and building centers.

Table 8.4 shows that large paint manufacturers have more retailers than smaller ones. KCC, Korean Chemical Co, is the biggest paint manufacturer in Korea with market share of 40 percent. The information is based on the agent's own files.

Table 8.4: Retailers related to manufacturers in Korea 1997

| KCC | Kunsul | Samhwa | Daihan | Byucksan |
|---|---|---|---|---|
| 912 | 500 | 650 | 700 | 200 |

### 8.2.2 Size of Retailers and Wholesalers

For later analyses of postponement solutions, distributors sales is one of the key issues. White and coloured paint have to be separately discussed because postponement in paint business does not influence production and distribution of white paints. Importance of coloured paints in target countries varies between 30 and 80 percent, the highest shares being in Malaysia (60%) and Japan (80%).

Another important point is the share of one manufacturer's paints in the distributor's assortment because the colour processing systems are applicable only for one manufacturer's base paints. In general, retailers/dealers and wholesalers do not act on an exclusive basis because they sell paints of many manufacturers. Importance of the main supplier's paints in wholesale level is between 40 (e.g. Malaysia) and 80 percent (e.g. Korea). At the retail level

the lowest rate is 40 percent (Malaysia) and the highest 70 percent (Korea). Thus, distributors in Korea seem to be more exclusive than in other countries.

Wholesalers' and retailers' paint sales were mainly asked from themselves but also many manufacturers gave their own estimations. The problem in manufacturer's estimations is that they often know just the sales of their own brands. On the other hand, they have a good overview of the distribution channels. The risk in asking the sales direct from a few retailers and wholesalers is that they may not represent the typical stores in target countries. These issues have been taken into account. Against the general rule that country-specific issues belong only to appendices sales in Korea and Indonesia as examples are described because the distributors' sales is one of the key issues in this study. In the end, the sales of distributors in other countries are compared to sales of these two countries.

**Retailers' Sales**

The retailers' average sales seem to vary between 10,000 and 15,000 liters. There is a lot of variations between answers, especially in Indonesia where the interviewed retailers were concentrated on paint selling.

*Korea.* Table 8.5 is based on the agent's summary of the channel members' estimations of retailers' sales. In case companies the sales in liters were the following: 11,000; 15,000; 18,000. So, they are quite near the average sales.

Table 8.5: Retailers' annual paint sales in Korea

| | Total paint sales | Coloured paints (30%) | One manuf. share (60%) |
|---|---|---|---|
| The average | 15 000 | 4 500 | 2 700 |
| The lowest | 10 000 | 3 000 | 1 800 |
| The highest | 50 000 | 15 000 | 9 000 |

*Indonesia.* Table 8.5 is based on other channel members' estimations of retailers' total sales. It suggests that retailers' average sales are about 25 000 liters. In case companies, the sales in liters were much higher: 48,000; 55,000; 270,000. The main reason for this difference is that the case companies are concentrated on paint products. In normal hardware stores the paint

sales are lower. Because the sales of the largest case company differs a lot from general estimations, it has not been taken into account.

Table 8.6: Retailers' annual paint sales in Indonesia

| | Total paint sales | Coloured paints (30%) | One manuf. share (60%) |
|---|---|---|---|
| The average | 25 000 | 7 500 | 4 500 |
| The lowest | 2 000 | 1 200 | 700 |
| The highest | 55 000 | 11 500 | 6 900 |

Compared to sales in the above tables, the total average sales in Malaysia, Philippines and Thailand seem to be between 10,000 and 15,000 liters and in one manufacturer's coloured paints between 3,000 and 5,000 liters. In Japan, the sales of one manufacturer's coloured paints vary between 6,000 and 130,000 liters in DIY stores. The sales in smaller professional stores are estimated lower.

In most countries, normal consumers and professionals visit the same stores. A few DIY-stores exist for instance in the Philippines and Thailand. The only country where DIY stores play a major role is Japan where the large "home centers" have been established outside the cities. The customers come mainly from country-side to buy paints for small repairing. The urban population exception to this being young people are too busy for repairing themselves. Another constraining factor for growth of DIY stores is that painting of apartments is not allowed without permission.

Manufacturers in Korea, Philippines and Indonesia claimed that tax regulations favor small retailers. In Indonesia it was claimed that the small stores do not have to pay value-added taxes. This is an important issue because if the taxes favor small stores, their existence in the future is more probable than without any special arrangements.

**Wholesalers' Sales**

Obviously, in wholesale level the sales are remarkably higher than in retail level. The size of wholesalers in different countries partially depends on their role. In Indonesia the wholesalers

are large units concentrating on wholeselling. On the other hand, in Korea the wholesalers are actually large retailers and wholeselling is just a small part of their business.

*Korea.* As in retail side, the agent concluded the channel members' estimations of the wholesalers' sales. In the case companies the sales in liters were: 72,000; 85,000; 120,000. So, in these companies the sales were slightly higher than the estimated average sales in Table 8.7.

Table 8.7: Wholesalers' annual paint sales in Korea

| | Total paint sales | Coloured paints (30%) | One manuf. share (80%) |
|---|---|---|---|
| The average | 70 000 | 21 000 | 16 800 |
| The lowest | 36 000 | 10 800 | 8 600 |
| The highest | 204 000 | 61 200 | 49 000 |

*Indonesia.* The wholesalers' sales are based on case company descriptions. A manufacturer's sales of coloured paints to wholesalers were 30 thousand liters which also supports the estimated average sales of 36 thousand liters.

Table 8.8: Wholesalers' annual paint sales in Indonesia

| | Total paint sales | Coloured paints (30%) | One manuf. share (X %) |
|---|---|---|---|
| The average | 300 000 | 90 000 | 36 000 (50%) |
| The lowest | 100 000 | 30 000 | 15 000 (50%) |
| The highest | 480 000 | 144 000 | 58 000 (40%) |

About the sales in other countries, in Malaysia the sales of one manufacturer's coloured paints are remarkably higher than in other countries, between 45,000 and 150,000 liters. In Philippines the same sales were between 30,000 and 70,000 liters but in Thailand below 40,000 liters. Japan is an exception because there the paints were delivered through the manufacturer's own area distribution centers. Because of this reason, the sales were about 1,500,000 liters. In analyzing the sales of coloured paints, it is worth remembering that in the store with a tinting system the share of coloured paints of total sales will grow in the long term.

### 8.2.3 Logistical Factors

As discussed in the theoretical framework, the inventory reductions belong to the main advantages of the form postponement. To be able to calculate the reductions, first the present level has to be known. As stated, demand fluctuations and long delivery times are reasons for high inventory levels. Seasonal behaviour also leads to higher capacity requirements.

The service level seems to follow the rule 70/95 also in the Eastern and Southeastern Asia. In other words, in stores with tinting systems the service level of 95% is reached but in traditional methods the level is 70 % or lower. In Indonesia, the service level can be in some retail outlets between 20-30 % because the retailers were not able to finance high stock levels.

Rule of thumb in paint stores without tinting systems seem to be that white and the best selling coloured paints, for instance 20 shades in Japan, are sold from stock. Special colour shades are usually ordered separately from a manufacturer. Table 8.9 suggests the average inventory levels in Korea.

Table 8.9: Stock levels in Korea

| Inventories (liters) | Stock level | Average sales | => Inventory turnover |
|---|---|---|---|
| Retailers | 3 000 | 15 000 | 5 |
| Wholesalers | 40 000 | 70 000 | 2 |
| Manufacturers | (1 month stock) | | 12 |

In Indonesia, both retailers and wholesalers keep stock of only one months sales. In Thailand, the interviewed medium-sized manufacturer keeps high stock levels at the factory warehouse, about three months inventory. In the contrary, retailers keep small inventories. Big dealers normally carry some extra inventory for popular items but special colours are always ordered from the manufacturer that never rejects the delivery of a small order. Transportation costs are paid at destination. The manufacturer has not established area warehouses for small orders.

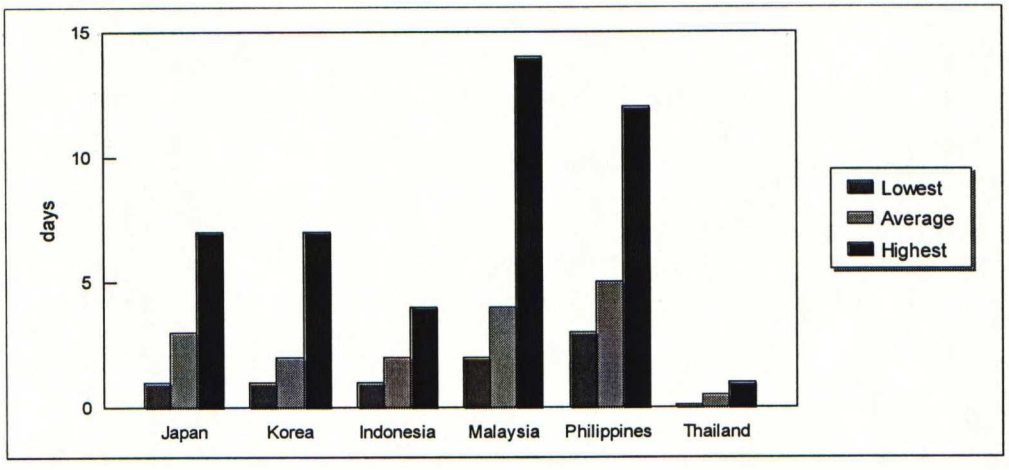
The main reason for seasonal demand fluctuations in the Southeastern Asia is the rainy season. It lasts for a few months and during it paint sales are low. In Philippines, the rainy season can last for six months, including monsoons and about 30 typhoons. In Malaysia,

repainting and renovations are often performed during the festive seasons which are small holidays for each ethnic group. On the other hand, in Korea and Japan, spring and autumm are the best seasons and at winter the demand is quite low.

**Delivery Times of Coloured Paints**

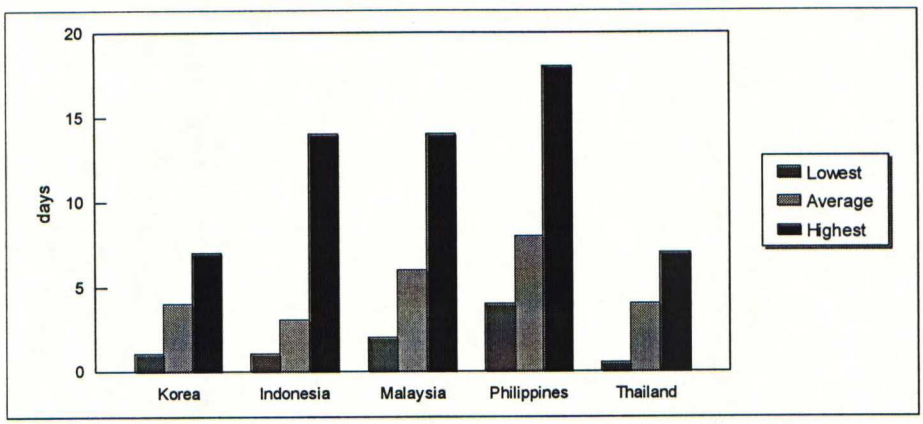
As Figures 8.2, 8.3 and 8.4 suggest, delivery times seem to be longer in archipelag countries than in other countries. Especially in deliveries between manufacturers and wholesalers the difference is quite clear. In the three archipelagic countries, delivery times can be even two or three weeks. In the contrary, in Korea almost all coloured paints can be delivered in one week. In Japan, the information from delivery times was only received in deliveries between wholesalers and retailers.

Figure 8.2: Delivery times from manufacturer to wholesaler



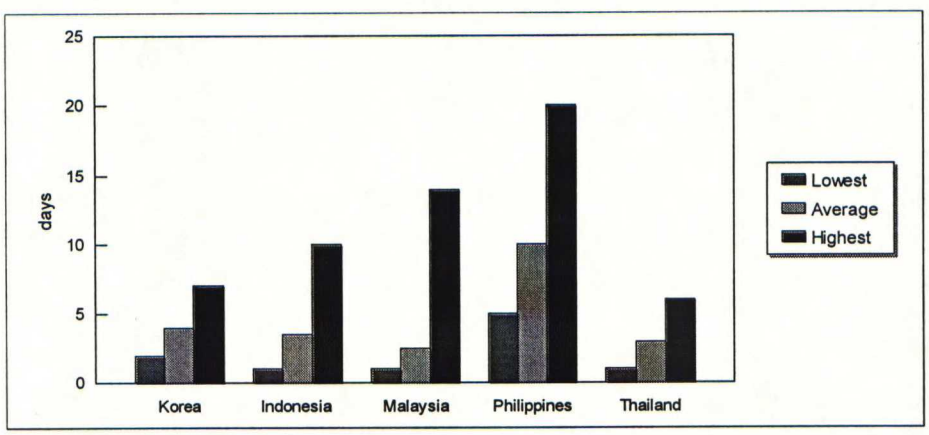

In archipelagic countries, there is a big difference in delivery times between distribution on the same island as the factory and in distribution to other islands. In the Philippines, for instance, a manufacturer delivers paints in a few days to a retailer on the same island but deliveries to retailers on other islands can last even three weeks from the order.

Figure 8.3: Delivery times from wholesaler to retailer




Between local wholesalers and retailers delivery times are not very long. On the other hand, the use of centralized warehousing methods increases delivery times.

Figure 8.4: Delivery times from manufacturer direct to retailer




A manufacturer in Japan has the practice that orders of coloured paints bigger than 1,500 liters are delivered from manufacturer and smaller amounts from the wholesaler. If retailer has the tinting system, very small orders are tinted there. Thus, the size of delivery may affect the length of delivery times.

### 8.2.4 Product and Demand Factors

Based on the theoretical framework, in addition to logistical factors, also product and demand factors influence the potential of postponement solutions. For instance, high product value and

increased number of product introductions favor postponement. From demand factors, price increase possibilities suggest potential of postponement solutions.

According to the "square root" formula, broader product range increases the complexity and affect the possibilities to get inventory reductions. In Sotheastern Asia the product assortment is narrow. There are normally one alkyd paint and latex paints with three quality levels, all offered both in indoor and outdoor options. The importance of quality levels depend on the company' profile and strategy. Paint quality is low compared to western countries but higher than in Middle East. Thus, all quality levels can be used in colour processing systems, but there can be some problems with dark and bright shades in low-end products. Only light shades can be offered in these paints. In Korea the basic product range of decorative paints is the following:

- latex paint indoor use (gloss/matt)
- latex paint outdoor use (gloss/matt)
- long alkyd paint (gloss/semi-gloss)
- lacquer (gloss/semi-gloss)
- the facade paints

For the above product range there are many different price levels (high/medium/low) available. In the contrary, in Indonesia and Thailand paints are offered mainly with one quality and gloss level. In Thailand, the interviewed medium-sized paint manufacturer has three quality levels which all are offered with outdoor and indoor alternatives. The brand with the lowest quality has the highest demand. The medium level is for housebuilders and the high quality for goverment's projects. Prices are the same both in white and coloured paints. The prices are in Table 8.10. In overall context in Thailand the importance of the different quality levels is the following: high-end 20%, middle-class 55% and low-end 25%.

Table 8.10: Prices of a manufacturer in Thailand

| US$/liter | Indoor | Outdoor |
|---|---|---|
| The lowest quality level | 0,95 | 1,4 |
| Medium level | 1,7 | 2,3 |
| The highest quality level | 3,7 | 4,7 |

As can be seen in Table 8.11, there is no difference between white and coloured paints in Korea. However, in shops with tinting systems a price increase of 50 percents in indoor paints and 15 percents in outdoor paints compared to white paints is obtained.

Table 8.11: Wholesaler's paint prices in Korea

| US$/liter | White paint | Coloured paint | Tinted paint |
|---|---|---|---|
| Indoor | 1,4 | 1,4 | 2,1 |
| Outdoor | 2 | 2,1 | 2,4 |

In Korea, there are no tinting machines in retail level. The typical price of normal coloured paints in retail level is US$ 1.60 (indoor) $ 2.40 (outdoor). Price increase possibilities based on customers' choice in retail level are estimated to be 10-30 %. In Japan, the tinted paint was 20 percent more expensive than basic coloured paints. The paint prices are remarkably higher than in the other target countries, between US$ 8.0 - 17.0. A reason besides the high standard of living is that small can sizes, under one liter, are widely used.

In Indonesia, the coloured paints are only 2-5 % more expensive than white paints. The typical price of coloured paints at retail level is US$ 1.70 (indoor) and US$ 2.60 (outdoor). The weak currency and importing 50-60% paint materials have caused extra costs and put pressure on margins. In Indonesia the retailers do not believe in the advantages of tinting systems and estimate that price increase based customer's choice could be only 5 percent. In the Philippines, the price of coloured/tinted paints is max 20% higher than that of white paints. In Malaysia, there is generally the same price for white and coloured paints. In Thailand, the higher price due to tinting systems is not yet widely accepted in the markets because traditional paints are remarkably cheaper.

In general, without tinting systems the maximum number of colour shades offered seem to be between 16 and 150 shades. It is claimed that 50 colour shades is the limit for succesive operations. Normally, from 15 to 30 colour shades are annually introduced. In a medium-sized case company the introduction of new colour shades is performed by following the big manufacturers and international trends.

### 8.2.5 Constraining Factors

Two important constraining factors in postponement implementation are channel members' problems and manufacturers' colour marketing expenses.

**Channel Member's Problems**

In the questionnaire each channel member has evaluated its cooperation with other members. Next the main problems in cooperation are discussed.

*Retailers.* Poor financing status seem to be the main problem in every country. The recession has been very difficult especially to small retailers and many of them have problems with overdue accounts. Sometimes weak financial situation has lead to difficulties to keep sufficient inventory. In Korea, a problem is retailers' poor technical backround. Thus, other channel member must help them every now and then.

*Wholesalers.* The results suggets that any particular problem does not exist in cooperation with wholesalers. For instance, financial problems are not so big an issue as in retail level. A Korean manufacturer is dissatisfied with wholesaler's very slow increase of sales volume. In Indonesia, a retailer claims that wholesalers' delivery times are long. Stock availability is sometimes a problem also in wholesale level, at least in Malaysia.

*Manufacturers.* Other channel members are mainly dissatisfied with manufacturers' long delivery times. Sometimes manufacturers do not keep sufficient stock available. Also many price changes have caused difficulties to retailers and wholesalers. In the Philippines, the lack of technical support from manufacturers' side seem to be a problem.

**Manufacturers' Colour Marketing Expences**

It is not an easy task to get accurate answers to this questions because manufacturers are not familiar with the difference of colour marketing and total paint marketing. Another important factor is that because colour marketing investments depend on having or not a tinting system,

the manufacturers with and without tinting systems are discussed separately. Manufacturers *without tinting systems* invest in colour marketing between 0.05 - 0.30 percent of their sales turnover. On the other hand, the variation in marketing expenses of tinting system users is large. In Korea, manufacturers *with tinting systems* still have low marketing expenses, between 0.10 and 0.20 percent of total sales turnover. In Malaysia, the colour marketing expenses of 0.50 percent and in Philippines 0.75 percent of total sales are found which is actually rather high and may based on total marketing costs. Implementation of marketing side seem to be problem. For instance, product assortment is not enlarged.

### 8.2.6 Plans for Using Colour Processing Systems

In general, colour processing systems are known only by the name. In Indonesia, a retailer claimed that hardly anyone is interested in tinting systems because it makes choosing the colour too complicated. According to him, buying a tinting system for a retail store would lower the quality of colours due to poor training and education of retailers.

In Malaysia, the standard of living is high compared to other countries in the Southeastern Asia. The population is learning to value tastes and variety which means that consumption based solely on need is decreasing. Therefore, due to higher requirements for housing importance of individually designed colours is increasing. One manufacturer and its distributors which use tinting systems, however, are not doing very well because many people still do not know their systems and the customers have not widely accepted the high price level. The new systems have been advertised on TV but the advertisements were rare and according to the agent's estimation also poorly done. Another problem is that the tinting machines are often placed outside the cities which may not attract the right sort of customers. Lack of manufacturers' control and support to retailers and wholesalers has lead to variations between outlets. Retailers and wholesalers themselves do not often have the right mentality to apply the system in its true sense.

According to the agent in Malaysia, the retail level would be more suitable for tinting systems. She argues that automatic machines are in higher demand compared to manual ones in the near future. In the Philippines, the agent also believes that more automatic machines will be

sold than manual ones. In Japan, the retailers are interested in tinting systems but the financing seems to be a problem. In Indonesia many different comments on the ideal location of tinting systems were given. The most realistic places seem to be the wholesalers' outlets and large retail stores. In Malaysia, mainly wholesalers, in some cases also retailers are interested in systems. According to the agent's estimations, the right location would be a store in the main town.

In Korea, from manufacturers' point of view, wholesale level would be the ideal location. Also the agent estimates that wholesale level would be more optimal than retail level. However, both wholesalers and retailers are planning to acquire a tinting system after recession. In the Phillippines regional distributors, branches and superdealers are the main locations for tinting systems. In one manufacturer's opinion especially dealers, building centers and shopping malls would be good locations because there is high visibility and consumer traffic. Based on retailers' assumptions of customers' needs, short delivery times and accuracy of colour shades seem to be more important than broad colour choice.

# 9. Analysis of Postponement Solutions

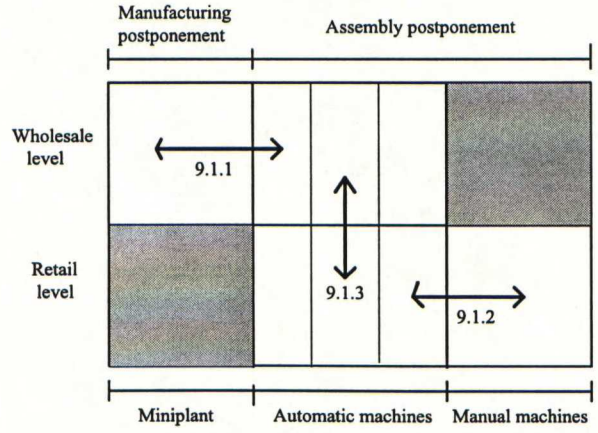
This chapter consists of three parts. First, the impact of postponement solutions on channel members' performance is measured. Second, demand for different solutions is evaluated. Finally, product strategy and marketing arguments for the postponement supplier are defined. The sales comprise **one manufacturer's coloured paints.**

About the assumptions, the investments are calculated using equal annuity rate of seven year and 15 percent. The interest rate is based on the commercial secretary's and the agents' average estimations. The rate should be appropriate to all countries in the long term, while in the short term rates can be higher because of monetary crisis and control of IMF.

## 9.1 Performance Analysis

The structure of this section is described in Figure 9.1. The detailed calculations of the analyses can be found in Appendix 10. As discussed, in distribution through wholesalers all three points have to be analyzed, but in direct distribution to retailers only the comparison between manual and automatic machines has to be made. The differences between different automatic machines relate mainly to capacity, speed and the space needed in the outlet. Because the calculations do not take into account sales growth or higher margins which are based on the shift from bulk to high-end products, these influences have to be discussed separately. In addition, total performance based on these analyses is discussed.

Figure 9.1: Parts of the analyses in section 9.1



Stock levels in the calculations are normally based on two months' inventories, because inventory cycle times of coloured paints are lower than those of white paints. Manufacturers have coloured paints in stock because production of smaller batches is not cost-effective. On the other hand, wholesalers and retailers who are not located near the manufacturer keep only the most common colours in stock. As special colour shades are often ordered from the manufacturer, only a portion of total colour range is taken into account, for instance 20 shades out of total 50.

### 9.1.1 Miniplant versus Tinting Systems

As discussed in the theoretical part, the advantages of miniplant are significant only if there is a need for high buffer stocks. In that case the inventory reductions would be remarkable. Thus, any factors that cause buffer stocks, for instance demand fluctuation and long delivery times, favor the miniplant solution. As noted in the previous chapter, the delivery times in archipelagic countries, Indonesia, Malaysia and the Philippines, are longer than other countries. Moreover, inventory levels relate also to sales levels. In addition, there is seasonal behaviour in demand in every country. As the measure of sales is one manufacturer's coloured paints, the optimal case would be the manufacturer's own distribution centers on islands.

The comparison is made between the miniplant and automatic machine with can transport. The capacity of the automatic machine is half a million liters. The comparison is made using two sales levels: 200 and 400 thousand liters. Because of demand fluctuation, the higher sales level (400 thousand liters) requires two automatic machines with three mixers. On the other hand, the lower sales level (200 thousand liters) requires two mixers.

The assortment used in the calculations is 4 cans sizes* 10 paint types*30 colour shades* 1 gloss level = 1200 articles. The assortment represents the average one in archipelagic countries. Paint cost per liter is US$ 1.5 both at the factory and warehouse because of the same owner. First, the comparison is made only with investment costs and inventory reductions.

Table 9.1: Miniplant vs. automatic machine with can transport (I)

| Sales (liters) | Miniplant | Automatic machine with can transport | Place |
|---|---|---|---|
| 200 000 | -30 120 | -5 209 | Warehouse |
| | 6 661 | 5 128 | Factory |
| | **-23 458** | **-80** | **Total** |
| 400 000 | -24 179 | 9 696 | Warehouse |
| | 13 323 | 10 257 | Factory |
| | **-10 857** | **560** | **Total** |

The results in Table 9.1 suggest that the benefits of inventory reductions in the miniplant are smaller compared to extra investment costs at both sales levels, including the inventory reductions at the factory. Due to the low paint price/quality, also the inventory holding costs are lower. Only a very high paint holding cost, 4 - 5 dollars, could help. However, this is not very usual in these countries. A broader assortment would not help because the square root of the complexity index between the assembly and manufacturing postponement remains at a low level in any case.

Based on the price increase possiblity of 15 percent, total performance at the warehouse level is shown in Table 9.2. As the factors other than inventories are the same in these calculations, absolute differences remain. However, the result suggests that with sales of 400 thousand liters of coloured paints, the miniplant is profitable without inventory reductions at the factory. However, the automatic machine is profitable already when the sales are 200 thousand liters.

Table 9.2: Miniplant vs. automatic machine with can transport (II)

| Sales (liters) | Miniplant | Automatic machine ... | Place |
|---|---|---|---|
| 200 000 | -10 360 | 14 550 | Warehouse |
| 400 000 | 15 580 | 30 062 | Warehouse |

A problem with the miniplant is that it cannot be used as a step towards retail tinting. Thus, before investing in miniplant equipment manufacturers should be sure that postponement at the retail level is not possible in the near future. The miniplant is, of course, possible in mix strategies when the manufacturer uses both miniplant and tinting solutions at the same time

but in different channels. An issue that is not taken into account in the calculations is that big tanks also lead to higher inventories than would otherwise be necessary.

The benefits of the miniplant are that the processing costs of components at the factory could be lower than in tinting systems. However, because the miniplant solution cannot be used as the only strategy in large-scale marketing it leads to a parallel production line with base paints, which causes diseconomies. In marketing, in direct deliveries to end-users who order large amounts in advance, a high service level can be offered with this system.

### 9.1.2 Manual versus Automatic Systems

In retail postponement the main question is the choice between manual and automatic systems. As mentioned, the capacity of the manual machine would often be sufficient. Nevertheless, also other factors influence the decision. In the calculation a small extra cost for the man power is calculated for manual machines. Moreover, the assortment used is narrower than in the other calculations because only the retail level is discussed.

Figure 9.2 shows the price increase needed to get profitable results from sales of 3,000 liters. The required increase is quite high in all machine alternatives, from 40 to 60 percent. The interesting point is that the manual machine does not offer a significantly cheaper alternative in that respect.

Figure 9.2: Comparison at retail level (sales 3,000 liters)

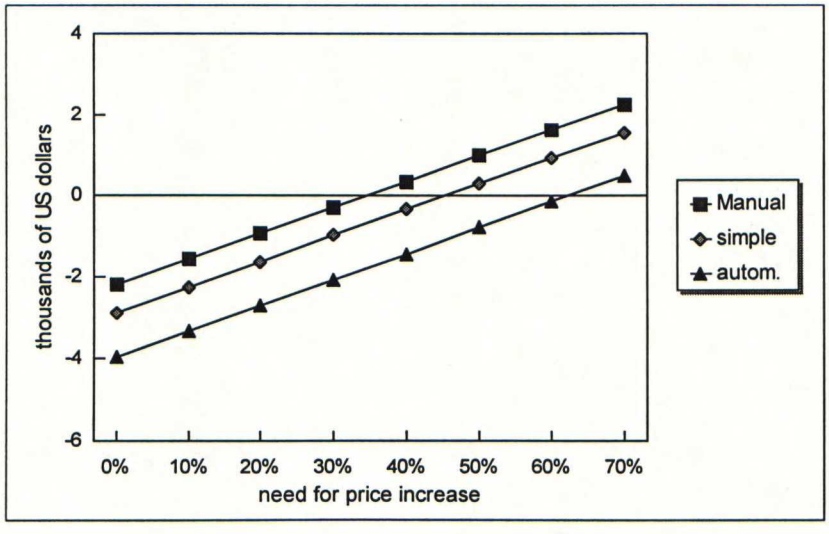
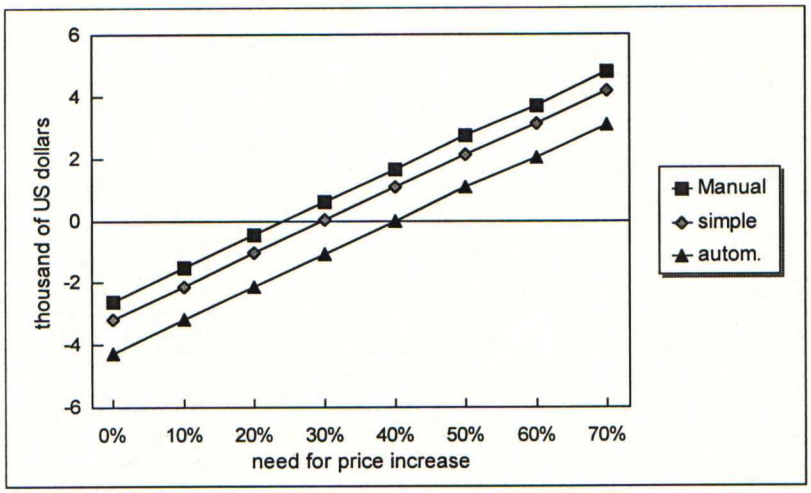


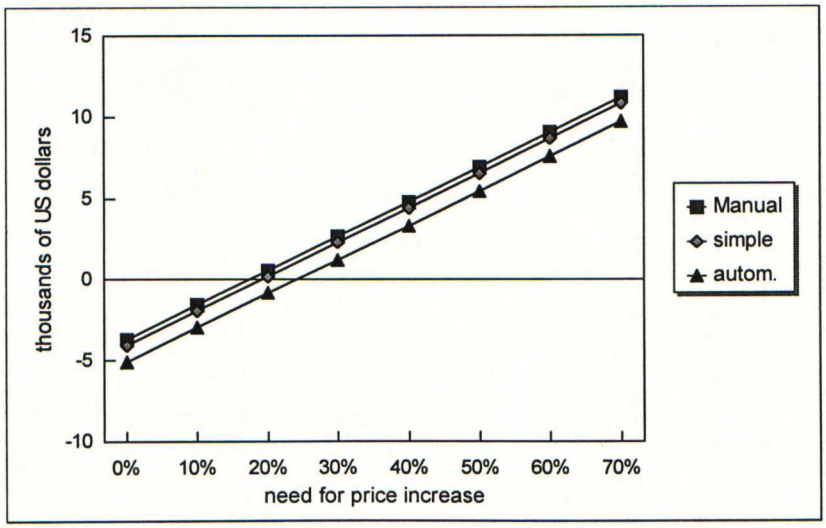
Figure 9.3 shows that with sales of 5,000 liters there is still a small difference between manual and simple automatic machines. However, as Figure 9.4 suggests, when sales are 10,000 liters, there is no more any difference between these options, but still a difference between manual and normal automatic machines. Thus, the simple automatic machine could be a potential alternative at both sales levels.

Figure 9.3: Comparison at retail level (sales 5,000 liters)




In short, when sales are 5,000 liters, a manual machine requires a price increase of 25%, simple automatic machine 30% and normal automatic machine 40%. When sales are 10,000 liters, manual and simple automatic machine require a price increase of about 20-25%. Thus, higher sales result in smaller differences because the investments can be utilized better.

Figure 9.4: Comparison at retail level (sales 10,000 liters)



To put it briefly, when sales are 3,000 liters or lower, the only cost-effective solution would be manual machines if the manufacturer did not compensate the difference. On the other hand, automatic tinting machines represent high-tech and are quicker to use which is an important factor in target countries because demand fluctuation requires high seasonal capacity.

### 9.1.3 Postponement Levels

Based on the information presented in Chapter 8, an example of the comparison of the postponement at retail and wholesale is calculated. The retailers have annual sales of one manufacturer's coloured paints of about 5,000 liters. Furthermore, the sales of the wholesaler are 35,000 liters, of which direct to end-users 10,000 liters. These are the distributors' average sales in Indonesia, the other countries are compared to this example at the end of the section.

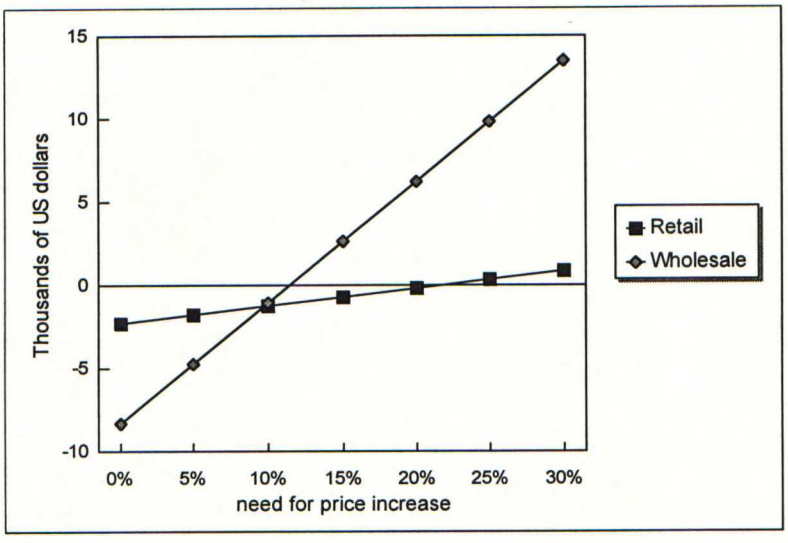
Using the phase model, first the wholesale postponement is discussed. From the wholesaler's point of view, it is wise to acquire the system for use in both direct and reselling. The smallest automatic machine, simple automatic machine, offers sufficient capacity. One of its advantages is that it is not too expensive only for direct selling purposes if retailers acquire their own systems at later stage. In postponement at retail level the manual machine is sufficient. If high sales increases were the goal, normal automatic machine at the wholesale level and simple automatic machine at the retail would be better solutions. However, the purpose of this example is the find out the minimum price increase required.

Inventory reductions are not remarkable at the wholesale nor especially at the retail level, because of the absolute amount of inventory, narrow assortment, and low price. Thus, a price increase should be obtained to get the profits against costs. As Figure 9.5 shows, in postponement at wholesale level a price increase of 10-15% would be necessary to make the investment feasible. On the other hand, a price increase of nearly 25% is required for retail postponement. Thus, the main question is how much more the end-users are ready to pay more for increased colour choice.

In postponement at the retail level the end-users get all colour shades immediately, but in postponement at the wholesale level only standard colours are immediately available, and

other shades are delivered within a standard time from the wholesaler. The importance of immediate delivery has not been taken into account in these calculations. Higher price increases may only be possible in retail postponement.

Figure 9.5: Price increases needed in retail and wholesale postponement (Indonesia)




The retailers in Indonesia claimed that end-users would not be ready to pay much for the increased colour choice, only 10 percent. Thus, wholesale postponement could be a better solution at least in the short term. If the price increase is that small, also the wholesaler should be large enough to be able to receive sufficient inventory savings and to utilize the capacity of a tinting machine. Compared to other countries, retailers average sales are often lower and wholesalers' sales slightly higher. In this respect, the difference between price increase requirements can be even higher, which favors postponement at the wholesale level.

The financial capability and possibilities to acquire a large and quick system are the main advantages in postponement at the wholesale level. The disadvantages are that the number of emergency orders between wholesalers and retailers can even increase compared to traditional production because of broader assortments. In postponement at the retail level, on the other hand, immediate deliveries can be offered and speculation, to a large extent, is unnecessary.

**Other Factors Compared to Price Increase**

Also sales growth and a shift to products with higher margins, from low-eand to high-end paints, can bring in extra profits. Often, the manufacturers try to get higher sales without price increases. If the distributor's margins were for instance 25%, then the impact of sales growth would be only about one fourth of that of a price increase. It follows that instead of a price increase of 25 % a sales increase of 100 % would be required which sound quite difficult. Thus, the sales growth cannot replace the price increase. Nevertheless, because the price increase possiblities seem to be restricted, these the other two ways should also be used.

### 9.1.4 Total Performance Analysis

In this section, the performance analysis based on the results of the previous sections is performed. First, the miniplant is discussed. In addition, automatic machines at the retail and wholesale level are analyzed. Finally, the suitability of manual machines is discussed. Between different automatic machines, only capacity and speed varies, other major differences do not exist.

*Miniplant.* The results suggested that inventory reductions are not a sufficient reason for choosing the miniplant compared to automatic machines at the wholesale level. Based on the discussion in the theoretical part, a few arguments can be found. First, large-scale economies at the factory can be obtained. Second, special colour shades can be produced at the warehouse, which guarantees short and standard delivery times to the end-users. The value of these factors is difficult to estimate, it would require further research. Actually, a pilot in Indonesia in cooperation with a local large manufacturer simulataneously testing the behaviour of these factors in the distribution channel by using activity-based costing and service-based measures would give the guidelines for the judgement of the potential of this system.

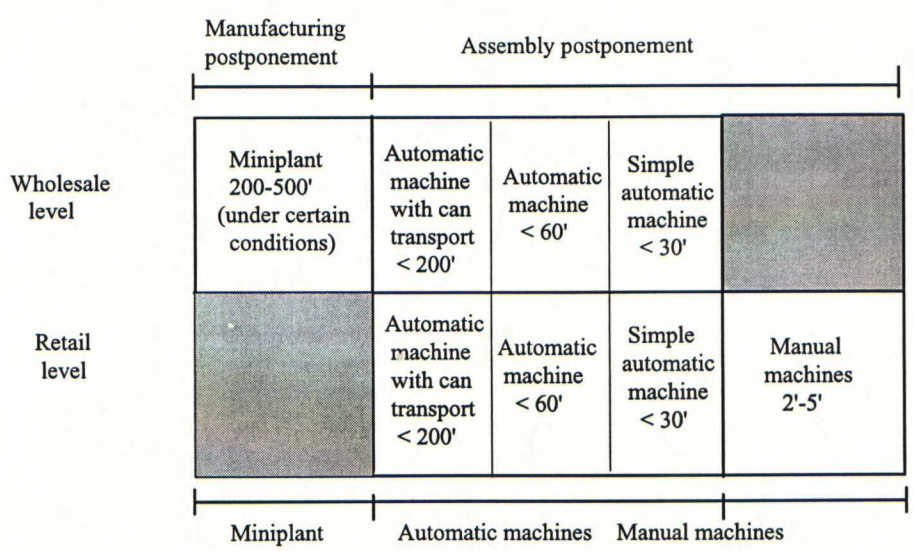
*Automatic machines at the wholesale level.* Wholesalers, including large retailers and superdealers, could start using automatic machines in an effective way in the short term because postponement at the wholesale level does not require high price increases.

*Automatic machines at the retail level.* When sales are 5,000 liters and over, the difference between automatic and manual machines is not significant anymore. The positive impact on channel members' performance, however, would require that margins, price and sales would be increased at the same time.

*Manual machines.* Because of low labour costs and the small size of retail stores, manual machines have the best impact on channel members' performance in most of the cases. Postponement at the retail level could be profitable if sales were higher than 2,000 liters. However, manufacturers may want a high penetration and are ready to cover part of the retailers' costs, manual machines could also be used in smaller stores.There are some retail stores in Indonesia and Thailand with sales of under one thousand liters. In these cases, postponement at the wholesale level could be wise also in the long term.

Table 9.6 shows, based on the capacities and results of the performance analyses, the ranges when each solution is worth implementing. Because of seasonal behavior in sales, about half of the maximum system capacity can be utilized. Of course, two machines instead of one can be acquired as did in Section 9.1.1. Moreover, there should also be additional capacity for a sales increase of coloured paints.

Figure 9.6: Suitability of postponement solutions of Tikkurila CPS



In the short term, postponement at the wholesale level is the most economic solution. If the manufacturer wants to penetrate the markets, tinting systems for small retail stores could be acquired. It requires, however, that the manufacturer is ready to finance the retailers' machines in the beginning, because price increases do not give sufficient profits. At the moment, many retailers have financial problems, which lower their interest in investments in the short term.

If wholesalers and large retailers would acquire automatic tinting machines, for image reasons even small retail stores should consider automatic machines, even if it were not profitable. This argument favors the simple automatic machine which represents the smallest automatic alternative.

As stated earlier, mix strategies of miniplant and tinting systems cause diseconomies at the factory because of two reasons. First, two production methods have to be used and thus economies of scale cannnot be fully utilized. Second, inventories at the factory warehouse for both product base paints and components are needed, which increases safety stocks.

## 9.2 Potential Analysis of Postponement Solutions

Based on the analyses of the previous section, this section discusses the potential of each solution both at the wholesale and the retail level. Finally, the conclusions are made.

### 9.2.1 Wholesale Level

As discussed, the wholesaler's importance and size varies by the country. In *Korea*, the role of wholeselling is quite minor, only large retailers act as resellers to smaller retailers. The average sales are 17,000 liters but the highest sales are about 50,000 liters. Financially the large retailers are quite strong, and because of that their role has grown at least in the short term. Thus, wholesale postponement is potential in the very near future. In addition to two automatic machines already sold at wholesale outlets, also simple automatic machines could be offered to smaller wholesalers.

In *Japan*, the manufacturers' area distribution centers (DC) would at the moment require a machine with very high capacity, actually fully automated tinting line would be in proportion to the volumes, 1,500,000 liters. The problem in the long term is that manufacturers are going to deliver direct to retailers, at least to large ones. This may mean that wholesalers' role will decrease and they will deliver only to small retailers. For this reason, the automatic machine with can transport could be the right solution in the long term.

In *Indonesia*, the wholesalers play a major role. The automatic machine could be the right solution in the first phase, in pure wholesale postponement. Because the wholesalers concentrate on reselling to retailers, the shift to postponement at the retail level in a later stage would remarkably reduce the amount of tinted paint. In these speculations the simple automatic machine would be a wise solution.

In *Malaysia*, there are already some automatic tinting machines at wholesale outlets. The sales of one manufacturer's coloured paint are between 45,000 and 150,000 liters which means that many kinds of systems could be offered. The main products could be a normal automatic machine and an automatic machine with can transport. About a half of the sales is sold to retailers. Thus, in case the shift postponement at the retail level would be implemented to a large extent, the normal automatic machine might be sufficient.

In *the Philippines,* sales are between 28,000 and 72,000 liters. Thus, the basic automatic machine could be the best solution in most of the cases. Many manufacturers have their own warehouses on islands but the number of independent wholesalers seem to be quite low, about twenty.

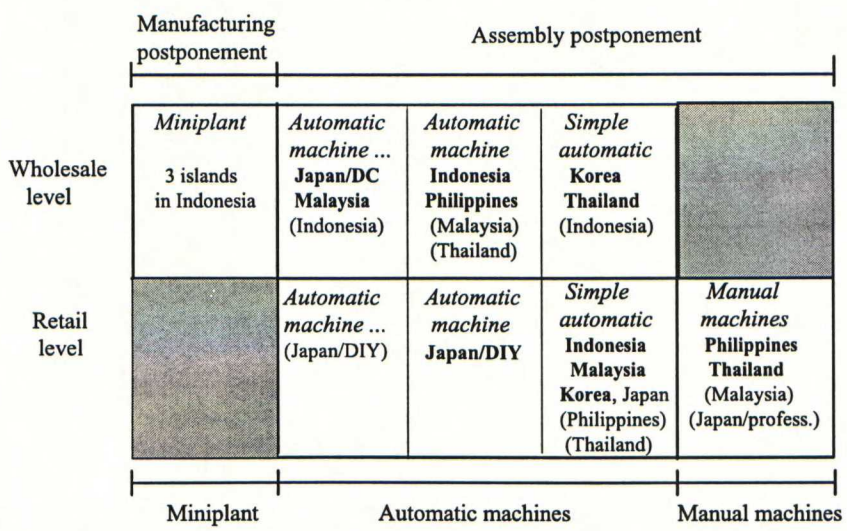
In *Thailand*, there are many kinds of wholesalers. There are superdealers in Bangkok, large retailers in provinces and also distribution centers. Because the sales of one manufacturer's coloured paints seem to be under 40 thousand liters in most of the cases, the simple automatic machine could often be sufficient.

### 9.2.2 Retail Level

The average sales of coloured paints in target countries varies between 3,000 and 6,000 liters. In Indonesia, when sales are 5,000 liters or higher, difference between manual and simple automatic machine is not remarkable. Thus, simple automatic machine because of its many advantages compared to the manual one can be recommendated. As discussed in the previous chapter, some manufacturers are concentrating more on retailers near the consumers, for instance in big shopping malls. This means that the importance of some marketing values may increase, for instance high-tech impression and quick service, which both favor simple automatic machine compared to manual one.

The results of the analysis cannot be directly used in Japan, because price level differs a lot from other countries. In large DIY stores with sales of over 100,000 liters the only appropriate alternative is the automatic machine with can transport. In smaller DIY stores, two other automatic options can be offered. In small professional stores, the situation is more complicated. On one hand, manual machine would suitable because end-users often do not see the machine. On the other hand, in Japan the labour cost is much higher compared to other target countries which favor quicker automatic machines. Because of higher margins in Japan, the small manual machine would be both a practical and profitable solution. The potential of the postponement solutions in target countries at both the wholesale and retail level are concluded in Figure 9.7.

Figure 9.7: Potential of different postponement solutions



## 9.3 Product Strategies

Based on the evaluated demand for different postponement solutions, product strategies for the system supplier are formulated. The analysis is performed from the largest to the smallest machine.

### Manufacturing Postponement - Miniplant

As the results suggested, the miniplant would only have a limited demand in Eastern and Southeastern Asia. The reason for this is that the extra investment costs cannot be covered by inventory reductions, not even at manufacturers' distribution centers in which both the reduction at the warehouse and the factory can be calculated together. The advantage of complexity reduction is significant between tinting systems and traditional production but not anymore between miniplant and tinting systems.

However, the miniplant can still have demand in archipelagic countries under the following conditions. First, the biggest manufacturers have warehouses with the sales of near 500 thousand liters. Then the capacity of automatic machine with can transport is not anymore sufficient, or three machines would be required. On the other hand, the fully automated tinting line is 2-3 times more expensive than miniplant. Second, manufacturers and end-users are satisfied with the service level of solutions in wholesale level in the long term. Additional research in this respect will be needed.

### Assembly Postponement - Tinting Systems

*Automatic machine with can transport.* Manufacturers' distribution centers and large wholesale outlets are appropriate locations. In retail level, this product does not have potential in target countries exception some large DIY retailers in Japan.

*Automatic machine.* In many cases this is the optimal solution for medium-sized wholesalers. Thus, in the short term this would be the best selling product of Tikkurila CPS Oy in Eastern and Southeastern Asia. Also large retail stores with high growth potential are appropriate.

*Simple automatic machine.* Evaluated demand for this machine is in retail outlets with sales of five thousands liters. Because a huge potential is expected in a few years, it is worth of putting effort both in production capacity and marketing of this product. The markets are waiting for this machine because it offers a good compromise between normal automatic machines, which are often too expensive, and manual machines, which do not offer high-tech impression.

*Manual machines.* This is the ideal solution in stores with sales of coloured paints between two and three thousand liters. In smaller stores wholesale postponement might be a better alternative. This is a product in which the price should be put as low as possible both to differentiate it from simple automatic and to be able to offer it also to very small stores. The purpose of this product is not to get good margins, but instead it works as a complementary product of the system marketing. The margins come from colourants and other consumable products.

### 9.3.2 Marketing Arguments for Postponement Solutions

As conluded in Figure 3.6, factors that favour postponement can be divided into three parts: demand factors, logistical factors and product factors. Of *demand factors* gap between ideal and available products exists but it has not been understood by channel members by today for instance in Indonesia. A reason is that the channel members do not know the advantages of postponement solutions. In a few countries in Asia marketing straight to retailers has been succesfully implemented. Because of cultural reasons this may work only in Korea of these countries.

In *logistics*, Eastern and Southeastern Asia is optimal because archipelagic nature lead to long delivery times and high freight costs. The demand fluctuations, in other words seasonal behaviour, lead to high buffer stocks. *Product*, coloured paint, does not have short product cycles and new colour shades are seldom introduced. Products may not be substitues but they are often used like they were. Also the value of the product is problematic, very low. Thus, there would be a huge potential mainly in logistical side. Also demand could be created if marketing investments were higher than today. More product lines could be obtained in line with postponement implementation.

However, to fasten the slow process toward postponement solutions following marketing arguments can be used. They are mainly based on channel members' fears toward colour processing systems and their present problems.

1) **Ease of use**. Use of tinting systems does not require technical backround in distribution sites. With automatic machines exact color shades can be guaranteed in every case.

2) **Simple deliveries**. Delivery problems with manufacturers can be reduced with colour processing systems because bulk deliveries instead of small shipments can be used between the manufacturer and point of product differentiation.

3) **Lower inventory levels require fewer financial resources.** For instance, during the low demand seasons expensive speculative stocks are not needed.

4) **Customer satisfaction**. Higher service level decreases the out-of-stock costs and increases customer satisfaction toward the retailer/wholesaler.

In addition, a manufacturer can get more dealers or at least greater part in the present dealers' sales. Special marketing problems in Eastern and Southeastren Asia have been the cost of colourants and low importance of colour choice. Compared to marketing values, the cost economies have been better arguments, for instance inventory reductions and simplified production. As noticed in the analysis, there is no possibility to get the system investment profitable based solely on cost reductions. Both a price and sales increase should be obtained.

There are some requirements for successive implementation. The manufacturer should give its own name for the system. In addition, marketing campaign after the implementation have been carefully carried out, using coordinated marketing strategy, for instance stable marketing investments. In general, manufacturer's distribution network should be large enough, to make the national marketing campaign possible.

From Tikkurila CPS's point of view, it should establish the service network as soon as possible because it would a sign of commitment. In addition, as the many paint manufacturers in Southeastern Asia are owned by Japanese companies, president of Tikkurila CPS Oy should continue the discussions about the Asia-strategy with the top-level directors of Japanese paint manufacturers. It could guarantee the position of Tikkurila CPS Oy as a leading supplier of colourants in the future in that area.

It is estimated that once a big manufacturer at large extent and according to advices implements postponement with its distributors, the positive cycle could be obtained. Due to increased awareness among end-users, they would be more demanding. In other words, customers would see that it can be something that they have never imagined: mass-customized colour shades. This is expected to occur in Eastern and Southeastren Asia in a few years. With the given product and marketing strategy Tikkurila CPS Oy can be one of the main players in this area.

# 10. Conclusions

This chapter concludes the results of the study and gives recommendations for the postponement system supplier. Also contribution to the earlier research and the subjects for further research are discussed.

## 10.1 Summary

Purpose of the study was to analyze the impact of form postponement solutions on channel members' performance in paint business in Eastern and Southeastern Asia. Furthermore, the system supplier's point of view meant that the demand for different postponement solutions was estimated. The normative theoretical framework worked as the main guideline during the analysis, giving the clear focus on the empirical part.

### Theoretical Part

Colour processing systems were divided into assembly and manufacturing postponement based on the article of Zinn and Bowersox (1988). The concept *form postponement* was redefined because the present definitions are based mainly on logistical and productional factors. Thus, the definition of form postponement is:

> "the strategy of delaying product differentiation as late as possible in the distribution channel provided that it creates additional benefits for each participant"

The factors that favor the use of postponement were divided into three categories: demand, logistical and product factors. Based on this categorization, potential of different products in different markets can be analyzed. On the other hand, performance factors were divided into categories: investments, cost economies and marketing values. As discussed, the marketing values creates a potential for price increases.

**Empirical Part**

Based on the normative theoretical framework, the suitability of different solutions in Eastern and Southeastern Asia was analyzed. The results suggested that the additional inventory reductions of manufacturing postponement compared to automatic machines do not cover the extra investment costs. Of assembly postponement solutions, demand for simple automatic machine is estimated to be high because of its small cost difference to manual machines. Manual machines, however, could have an important role as an supplementary product in system assortment. As the customers are estimated to be reluctant to pay a high price premium for colour choice, postponement solutions in the first phase are appropriate mainly at the wholesale level. When the customers' demand for colour choice increases, the postponement in small retail stores might be profitable.

Thus, the impact of postponement on channel members' performance in paint business in Eastern and Southeastern Asia can be positive if the implementation is performed in the phases, first at the wholesale level including in addition to merchant wholesalers also manufacturers' distribution centers and large retailers. Postponement in small retail stores, which are the main group in Eastern and Southeastern Asia, could be implemented at a later stage. The importance of large retail stores is, however, increasing.

The results of the study are restricted to paint business. However, there results are valid in other than target countries in Asia provided that the size of the retailers is small and wholesalers play a major role.

## 10.2 Recommendations for Postponement System Supplier

Tikkurila CPS's present strategy is to concentrate on automatic machines. The results suggest that the development of simple automatic machine has been an excellent idea because it supports the company's position as a leading supplier of advanced tinting systems. However, the production capacity of manual machines should also be increased. At the same time, the price of manual machines should be decreased in order to be able to offer it as a complementary product when the manufacturers start to enlarge the postponement solutions to

small retail stores. Manufacturing postoponement, miniplant, needs further analyses before commercialization. The strength of Tikkurila CPS in Asia is that it can offer a broad variety of different postponement solutions. It is an important factor because of disparity of retailers' and wholesalers' sizes.

## 10.3 Contribution to Earlier Research

The study took an analytical approach to present postponement discussion and enriched it with discussions of mass customization and time-based competition. The theoretical framework gave the basic analytical tools to estimate the postponement solutions all over the world, not only in Asia. The disparity of countries, small size of retailers and wholesalers' major role demanded that a broad variety of postponement solutions had to be included in the study. In other countries, the performance analysis could be much simplier.

The findings of this study are supported by Zinn and Bowersox (1988). They argued that high unit value of the products and demand fluctuation favor both assembly and manufacturing postponement. Furthermore, they claimed that product value is the most important variable that justifies manufacturing postponement. As stated above, the low product value in Eastern and Southeastern Asia made inventory reductions insignificant and lowered especially advantages of the manufacturing postponement in paint business.

Because postponement and channel structure in Eastern and Southeastern Asia as an area of investigation are enormous, there are still many topics for further research. First, the results and framework of the study could be analyzed separately in deep company analyses. Second, there are many rapidly developing countries in Asia, Africa and South-America where the demand for postponement solutions could also be analyzed. Third, use of both manufacturing and assembly postponement by the same manufacturer would cause some diseconomies in production and inventories compared to using of only the other one. The finding of optimal point in different situations would be a critical question. Fourth, modifications of the theoretical framework for other business areas would be an interesting research area as well.

The study assumed that the present channel practices are preserved. However, if they were changed, many new alternatives would be available. For instance, the miniplant in manufacturer's distribution center on island could start to produce paints for large paint projects to which the paints are normally delivered direct from the factory. In this alternative, the miniplant eould be in the first phase serve retailers, normal direct buyers, and new direct buyers, e.g construction firms. At a later stage, the retailers could acquire their own machines but the sales to the new customer base could still be sufficient for profitable results. Furthermore, for instance in Australia, the distances and delivery times are long and the product value would also be high. In these circumstances, the miniplant could work as a decentralized production unit, "the second factory", solely for large project buyers, such as construction firms.

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## Interviews

| | | | |
|---|---|---|---|
| Aulanko, Vesa | Executive vice president | Tikkurila CPS Oy | 15.10.1997<br>04.12.1997<br>17.03.1998 |
| Dörper, Ingo | Sales manager | Tikkurila CPS Oy | 17.12.1997<br>18.02.1998 |
| Gootjes, Bas | Sales manager | Tikkurila CPS Oy | 09.12.1997 |
| Laitala, Simo | Sales manager | Tikkurila CPS Oy | 14.04.1998 |
| Luomahaara, Päivi | Manager, colourant applic. | Tikkurila CPS Oy | 28.04.1998 |
| Hirao, Norizo | Senior trade advisor | JETRO | 14.10.1997 |

**APPENDIX 1**

## Advantages and Disadvantages of Vertical Integration

| *Advantages* | *Disadvantages* |
|---|---|
| **Control**<br>a) uncertainty reduction<br>- costs<br>- quality of supply<br>- quantity of supply<br>b) convergent expectations<br>c) reduced opportunity of opportunism<br>d) reduced opportunity of externalities<br>- dependence on monoply suppliers<br>- protect important proprietary/ competitive knowlwdge<br>e) ease of conflict resolution<br>- easier to enforce/monitor internal compliance<br>- more readily available rewards internally<br><br>**Communication**<br>a) improved co-ordination of processes<br>b) greater goal congruence<br><br>**Cost**<br>a) economies of scale through avoidance of intermadiaries<br>- procurement<br>- sales promotion<br>- distribution<br>b) process integration<br>- technical or physical integration<br>- improved asset utilisation<br>c) avoid swithing/transaction costs | **Limiting competition**<br>a) more difficult for non-integrated firms to enter business<br>b) weaken non-integrated competitors<br>c) inability of vertical integration to replicate market incentives<br>- less awareness of market issues<br>- size preserving tendency<br>d) internal information distortion<br><br>**Diseconomies**<br>a) balancing scale economies<br>- volume requirements vary by process<br>- firm has insuffient volume to achieve scale<br>b) inability of management to control large organization effectively<br>c) limits on span of control<br>- increased inefficiency<br>d) increased difficulty in communication<br>- large size of firm<br>- all communication cost born internally<br><br>**Risks**<br>a) asset concentration<br>- exit barriers<br>b) perceptuate obsolate processes<br>c) exaggerate synergies |

Source: Ellram 1993

**APPENDIX 2**

## Methods for Estimating Cost and Profits

*Activity-Based Costing (ABC).* The use of activity-based costing may enable both suppliers and customers tp better understand the real sources of costs in supply chain. Larger size, greater product diversity and higher level of exports, or competition, differentiate ABC-users from non-users. Activity-based costing as a method measures the cost and performance of process-related activities and cost objects. It assigns cost activities based on their use of resources, and assigns cost to cost objects, such as products or customers, based on their use of activities. (Cokins 1992, 4; Malmi 1997, 56)

*Direct Product Profit (DPP).* Distribution cost per product is often not available in more traditional accounting systems. There are, however, accounting systems capable of providing the type of data. These systems are based on direct costing. Direct costing systems ignore costs that cannot be directly assigned to a specific product. The criterion used to assign a cost to a product is to include only those costs that are reduced to zero if the product is eliminated from the product line. The major advantage of direct costing is that it avoids distortions introduced by often arbitrary cost allocation rules. One increasingly common example of direct costing systems is DPP, direct product profit. DPP is widely used to assess shelf-space profitability. To a retailer direct product profit is a measure of an item's actual contribution to overall profit. It goes beyond the traditional measure of gross margin by two ways. First, it adjusts the gross margin for each item to reflect deals, allowances, net forward buy income, prompt payment, discounts, etc. Second, it identifies and measures the costs, like labour, space, inventory and transport, that can be directly attributed to individual products. (Zinn 1990; Christopher 1997, 51)

**Direct Product Profit (DPP)**

(Christopher 1997, 52-53)

Figure: Steps from a gross margin measure to DPP.

| The net profit contribution from the sale of a product after allowances are added and all costs that can be rationally allocated or assigned to a individual product are subtracted |
|---|
| Sales<br>- Cost of goods sold<br>= Gross margin<br>+ Allowances and discounts<br>= Adjusted gross margin<br>- Warehouse costs<br>* labour (labour model - case. cube, weight)<br>* occupancy (space and cube)<br>* inventory (average inventory)<br>- Transportation costs (cube)<br>- Retail costs<br>* stocking labour<br>* front end labour<br>* occupancy<br>* inventory<br>= Direct product profit |

Because product characteristics and associated costs vary so much item by item (e.g. cube, weight, case pack count, hadling costs, space occupied) the retailer needs to calculate the DPP at the item level. Similarly, because shelf-space is the limiting factor for the retailer the key measure of performance becomes DPP/square meter or even DPP/cubic meter. The key issue to the retailer is the shelf yield which is calculated as follows:

$$\text{Shelf yield} = \frac{\text{DPP per item} * \text{sales per week}}{\text{Square metres occupied}}$$

Thus, an item could have a low gross margin but have low direct product costs, high sales and low space occupancy so delivering a high shelf yield. Conversely, a high gross margin product but with high direct product costs and low sales per week occupying more shelf space will deliver a low shelf yield.

**APPENDIX 3**

## Benetton as an Example of Flexible Manufacturing

Previous studies (e.g. Pirnes 1996) of time-based management have mainly concentrated on clothing industry. Benetton is a well-known example. Case Benetton also relates closely to postponement, as the main innovation in manufacturing is based on postponement (Feitzinger & Lee 1997).

Traditionally, the manufacture of clothing starts with dyeing of the yarn followed by the knitting of the garment. The problem inherent in this sequence is that the knitting process is slow, so that meeting customer service expectations requires high levels of inventory of finished garments. The likely result of the traditional approach is that invariably the desired colours will be out of stock while there are excess inventories of unpopular colours. (Dapiran 1992)

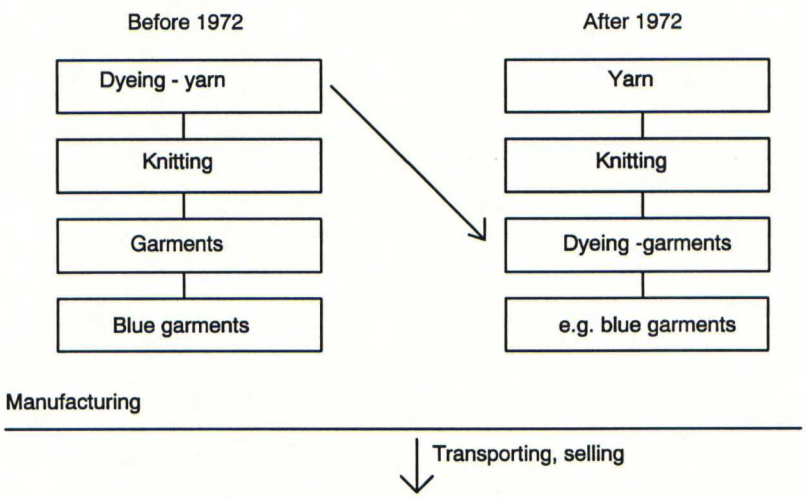
Perhaps the most significant development in Benetton's operations occured when the company began dyeing assembled garments rather than yarn in 1972 for single colour clothes. The garment dyeing capability allowed more popular items in Benetton's line to be produced in response to requests for changes in preseason orders from agents serving retail outlets. As a result of this development, it was estimated that Benetton's inventory turnover for cotton and woolen items at the factory was no less than the typical industry level in spite of the fact that its product line for knitted wear contained nearly 500 different color and style combinations. (Signorelli & Heskett 1986)

The production process is based on the color of incoming retail orders. Benetton's selected retailers are equipped with point-of-sale devices that transmit current sales information instantly by satellite to headquarters, indicating the hot selling colors and styles. This permits Benetton to conduct more accurate production planning and shipment. Benetton owes a large part of its success to its high investment in information power. (Kotler 1994, 578). However, the author's opinion is that agent and franchising network of Benetton has lost some of the advantages of excellent manufacturing because they cannot make extra orders once ordered in advance. So, a shopkeeper or a consumer cannot utilize same advantages as Benetton as a

parent company. To a certain extent it can be explained, nevertheless, by textile industry practises.

The new way of action, which is shown in figure 3.2, allows quicker response to customer needs. The need for large inventories decreases, only gray garments need to be kept in stock. This process innovation offers Benetton four rewards. First, there are cost savings by delaying addition of expensive dyestuffs. Second, new way of action offers better customer service by matching supply and demand. Third, customer desired stock available increases sales. Fourth, there are fewer write-downs for the same reason. (Dapiran 1992)

Figure: Process resequencing in Benetton




Source: Modified from Signorelli & Heskett 1986

**APPENDIX 4:**

## Tinting Terminology

Base paint =

Colour and colour strength controlled paint into which the colourants are added according to the colour formula.

Colourant =

Colour, colour strength and rheology controlled stable pigment concentrate of reproducible quality.

Dispenser =

Volumetric colourant dosing equipment, tinting machine.

In-can tinting =

Adding colourants into cans already containing the base paint.

Mixer =

Tool for mixing the can containing the base paints and the dispensed colourants.

Remote location tinting =

Point-of-sale tinting. Tinting in a shop, warehouse or depts (outside the paint factory)

Shaker =

A machine for mixing paints with colourants (vertical up-and down motion)

Spechtrophotometer =

Instrument (optical) for colour measurement.

Tinting equipment =

A common name mainly for dispensers and mixers

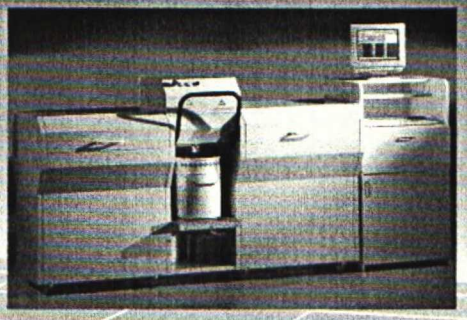
Source: Tikkurila Oy

# TIKKURILA CPS FAMILY OF EFFICIENT DISPENSING MACHINES



MONIMATIC STUDIO

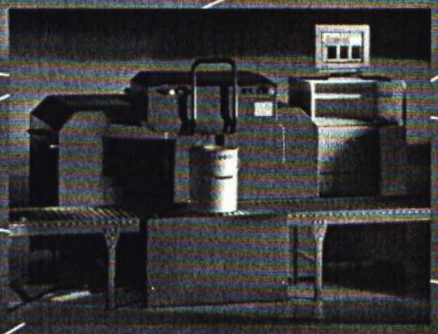
MONIMATIC RONDO



TEMATIC TEMPO

HANDYMIX

WINTERMIX SPECIAL

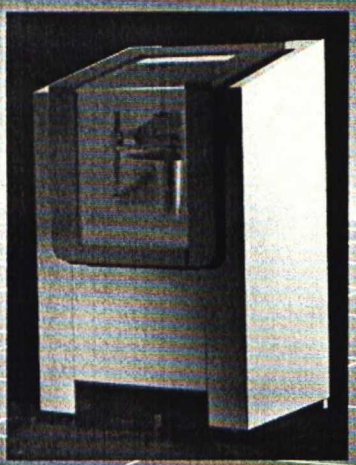


TINTING STATION

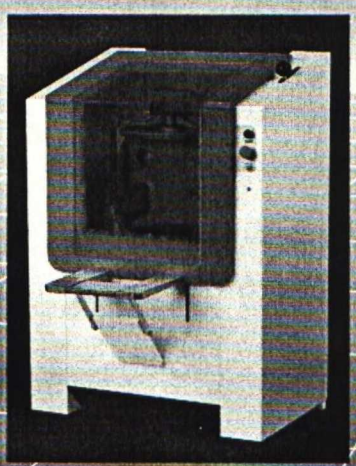
TIKKURILA PS

# TIKKURILA CPS FAMILY OF EFFICIENT MIXERS AND SHAKERS

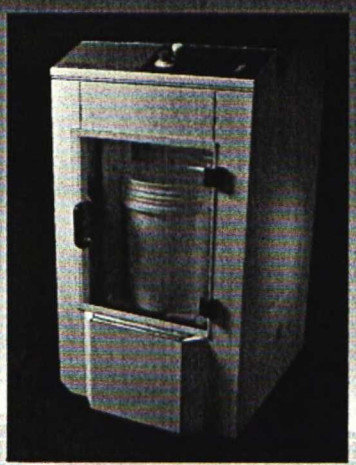




WINTERMIX CAROUSEL WX-6



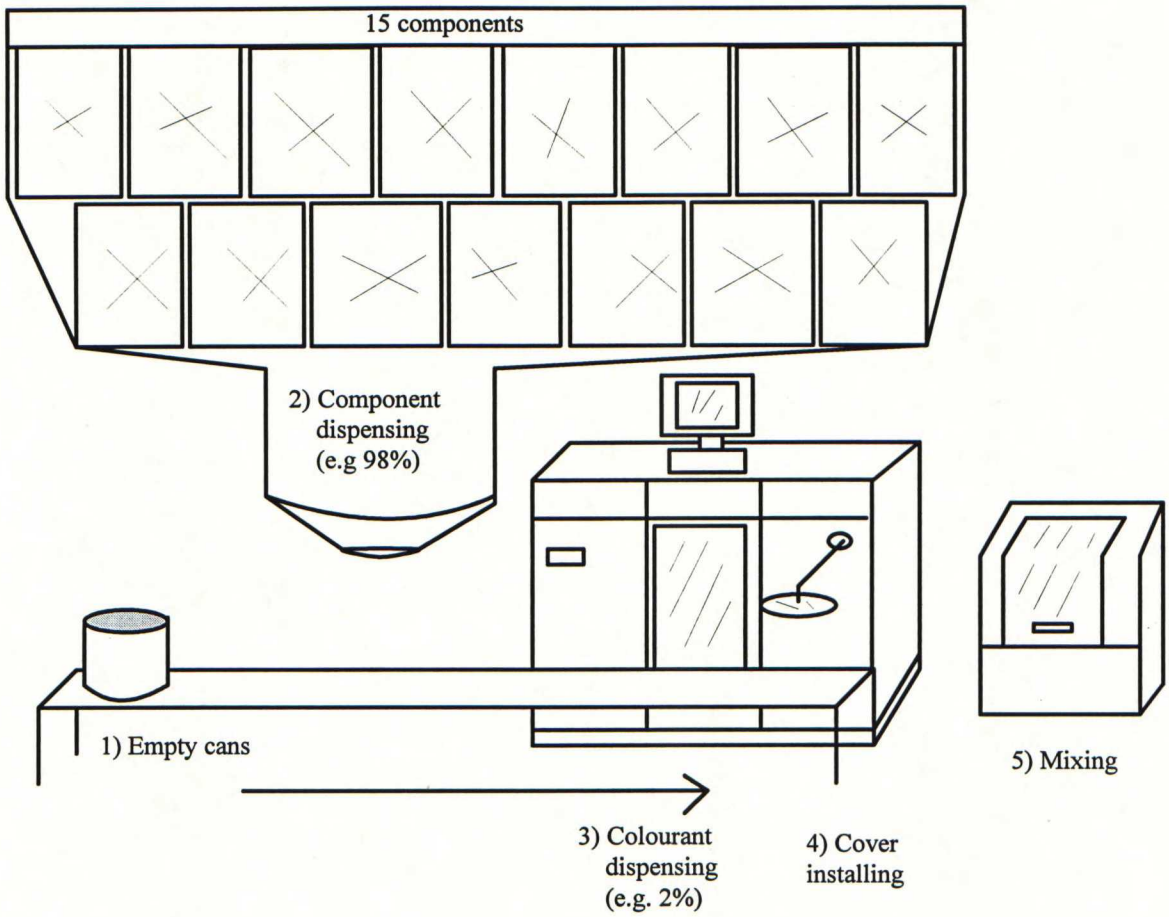
WINTERMIX CAROUSEL WX-7



VCM SHAKER

TIKKURILA CPS

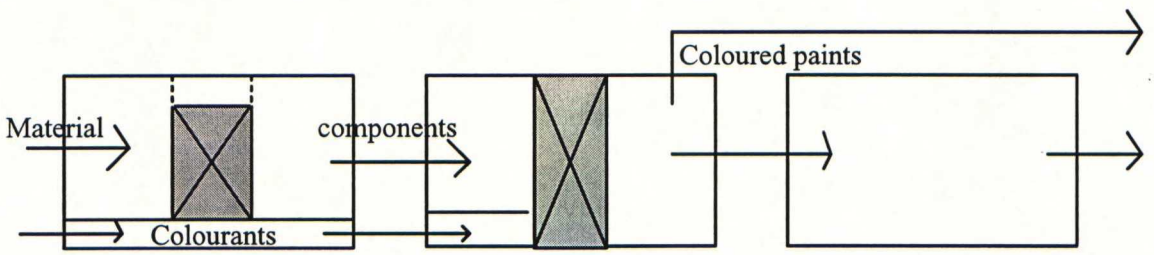
# Miniplant - manufacturing postponement alternative



APPENDIX 5:

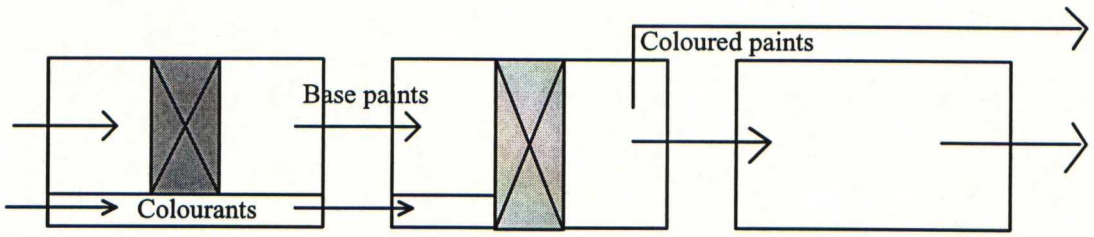
Based on discussions in the chapter four three performance categories are analyzed: investments needed, cost economies, and marketing values. All factors are analyzed at the factory, in wholesale level, and in retail level. Positive impact on channel member's performance is (+) and negative impact is (-). Changes are compared to situation without postponement, in other words to traditional production. In these examples only deliveries to retailers are taken into account.

**Manufacturing postponement by wholesaler (miniplant)**



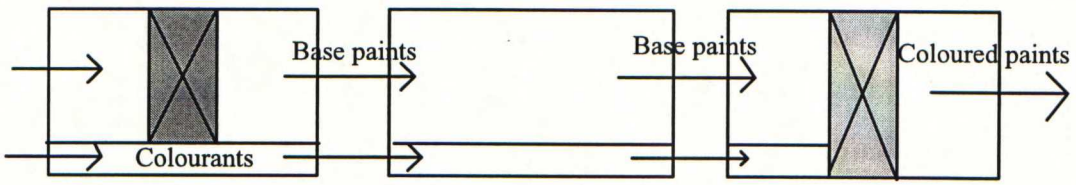

| | Manufacturer | Wholesaler | Retailer |
|---|---|---|---|
| **Investments** | | - large investment<br>- colour display | - colour display |
| **Cost economies** | | | |
| Inventory levels | + only component inventories (=cheaper to stock) | + only component inventories | + lower inventory levels because more reliable delivery times |
| Transportation/freight costs | | + bulky deliveries/ ubiquitous materials | - large offer of delivered-from-order colours may lead to many small and expensive shipments |
| Processing and material costs | + decreasing working duties | - extra packing costs and increased working duties<br>- cost of colourants<br>+ buy-in prices decrease | - higher purchase prices because of cost of colourants |
| Marketing material costs | - colour cards | | |
| **Marketing values** | | | |
| Service level | | + high service level | + certain colours immediately, for other colours standard delivery times |
| Customers' choice | | + colour assortment increases<br>+ possibility to ask higher prices | + delivered-from-order colour assortment increases<br>+ possibility to ask higher prices |
| Other issues | | + possibility to serve big customers without huge inventories | |

## Assembly postponement by wholesaler (automatic tinting machines)



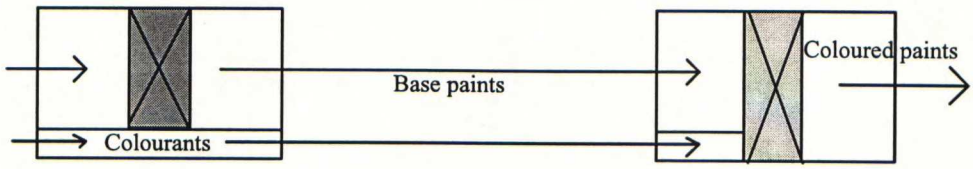

| | Manufacturer | Wholesaler | Retailer |
|---|---|---|---|
| **Investments** | | - automatic tinting system<br>- colour display | - colour display |
| **Cost economies** | | | |
| Inventory levels | + lower inventory levels | + only base paints in inventory | |
| Transportation/ freight costs | | + bulky deliveries (full pallets) | - large offer of delivered-from-order colours may lead to many small and expensive shipments between wholesaler and retailer |
| Processing and material costs | + simplier processing, large batches<br>- increased quality requirements for base paints | - increased working duties<br>- extra cost of colourants | - higher purchase price |
| Marketing material costs | - marketing campaigns, colour cards | | |
| **Marketing values** | | | |
| Service level | + higher service level | + higher service level | + certain products immediately, for other products standard delivery times |
| Customers' choice | | | + large delivered-from-order assortment<br>+ possibility to ask higher prices |

**Assembly postponement by small retailer (manual tinting machines)**




| | Manufacturer | Wholesaler | Retailer |
|---|---|---|---|
| **Investments** | | | - manual machine<br>- colour display |
| **Cost economies**<br>Inventory levels | + lower inventory levels | + easier demand forecasting, economies of scale in product handling | + lower inventory levels |
| Transportation/ freight costs | + decreasing costs due to larger batches | + bulky deliveries | + decreasing number of emergency orders |
| Processing and material costs | - increasing quality requirements | | - increased working duties<br>- cost of colourants |
| Marketing material costs | - marketing campaigns and colour cards | | |
| **Marketing values**<br>Service level | + higher service levels | + higher service levels | + high service level, all colours immediately, out-of-stock costs are minimized |
| Customers' choice | | | + large colour offer<br>+ possibility to ask higher prices |

## Assembly postponement by large retailer (automatic tinting machines)




| | Manufacturer | Retailer |
|---|---|---|
| **Investments** | | - medium investment<br>- colour display |
| **Cost economies** | | |
| Inventory levels | + lower inventory levels | + lower inventory levels |
| Transportation/ freight costs | | + decreasing need for emergency deliveries, shift to bulk deliveries (full pallets) |
| Processing and material costs | + simplier process, larger batches | - increased working duties<br>- cost of colourants |
| Marketing material costs | - marketing campaigns and colour cards | |
| **Marketing values** | | |
| Service level | | + high service levels, all colours immediately, out-of-stock costs are minimized |
| Customers' choice | | + large colour offer<br>+ possibility to ask higher prices |
| Other issues | | + possibility to serve large customers without huge inventories |

Assumptions:

- retailers in wholesale postponement keep fast-cycling colours in inventory and order special colours from wholesaler
- large orders (over 1000 liters) can also be delivered from manufacturer using traditional production methods or in-plant tinting
- buyer pays the freight costs
- retailers pay postponement equipment, however manufacturers can take part of financing it
- in wholesale postponement the wholesalers need colour marketing material only if they also act as a selling unit.

**APPENDIX 6:**

## Statistics of Eastern and Southeastern Asia

Table: GDP in target countries in 1994

| | US$ per capita |
|---|---|
| Japan | 36 780 |
| South-Korea | 8 520 |
| Malaysia | 3 580 |
| Thailand | 2 454 |
| Philippines | 970 |
| Indonesia | 790 |

Source: SY 1997, 149-166

Table: The Chinese in Southeastern Asia

| | % Chinese |
|---|---|
| Indonesia | 2,7-2,8 |
| Philippines | 1,2-1,5 |
| Malaysia | 30,9-33,1 |
| Thailand | 8,0-11,29 |

Source: Hodder 1996, 2

Table: Area, density, and urbanization rate

| | Area ($km^2$) | Inhabitants / $km^2$ (1994) | Urban population % (1995) |
|---|---|---|---|
| Japan | 377 801 | 330 | 77,4 |
| South-Korea | 99 263 | 449 | 74,4 |
| Indonesia | 1 904 469 | 102 | 30,9 |
| Malaysia | 329 758 | 60 | 50,6 |
| Philippines | 300 000 | 221 | 42,7 |
| Thailand | 513 115 | 113 | 18,7 |

Source: DY 1997, SY 1996

As Table shows, in developed countries, like Japan and South-Korea, population is concentrated on cities. Japan is by far the most urbanized country in Asia. Tokyo with Yokohama and the adjointing areas, though, make up the world's most populous urban area with 27.2 million residents. (Dunung 1995, 2; Sargent 1997) The South-Korean population is

also highly concentrated in cities, as almost 75% of Koreans live in urban areas, making Seoul, the main commercial and capital city with over 11 million people, one of the most populous cities in the world. Population density of South-Korea in 1994 was ranking third in the world (CSA 1995, 7-8).

In Southeastern Asia, the population is concentrated on certain areas. In Thailand, the capital Bangkok is the country's largest city and the heart of the country (Dunung 1995, 328-329; Inkinen 1996, 13). In the Philippines, the shortage of lowland means that population is concentrated in a relatively small area (Demaine 1997c). In Malaysia Peninsular Malaysia is the most urbanized part of the country (Demaine 1997b).

# Questionnaire

Please answer all questions

Company: _____

Contact person and title: _____

Address: _____

Telephone and fax number: _____

*- Confidential -*

**Only for use in Tikkurila CPS and in Helsinki School of Economics and Business Administration**

THANK YOU FOR YOUR ANSWERS

Anton Helander, Helsinki School of Economics
and Business Administration

## CHANNEL STRUCTURE FOR DECORATIVE PAINTS

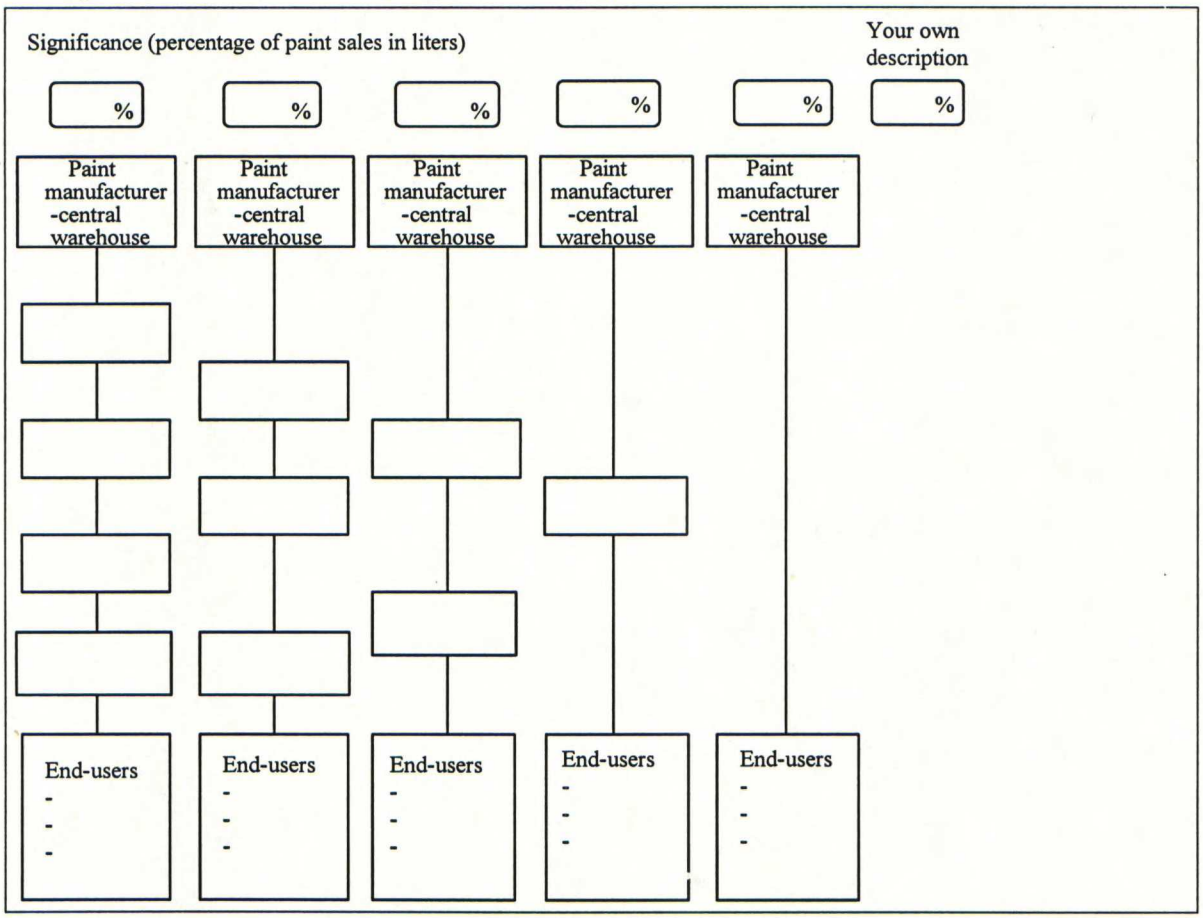
<=> sales to industrial organizations do not belong to this study

Describe the distribution channel from manufacturer to end-users (=segments). The *end-users* could be for instance: construction firms/large paint projects (PROJ), small builders/ professionals (BUILD), do-it-yourself-customers (DIY), ...

- Describe the significance of the channels as a percentage of sales in liters
- The difference between physical and marketing channels is that, for instance, dealers who do not have warehouses belong only to the marketing channel.

### **Marketing channel** (selling organization)

- Please fill the channel members in boxes: sales offices (SO), dealers (D), wholesalers (W), headquarters of retail chains (RC), retailers (R), ...

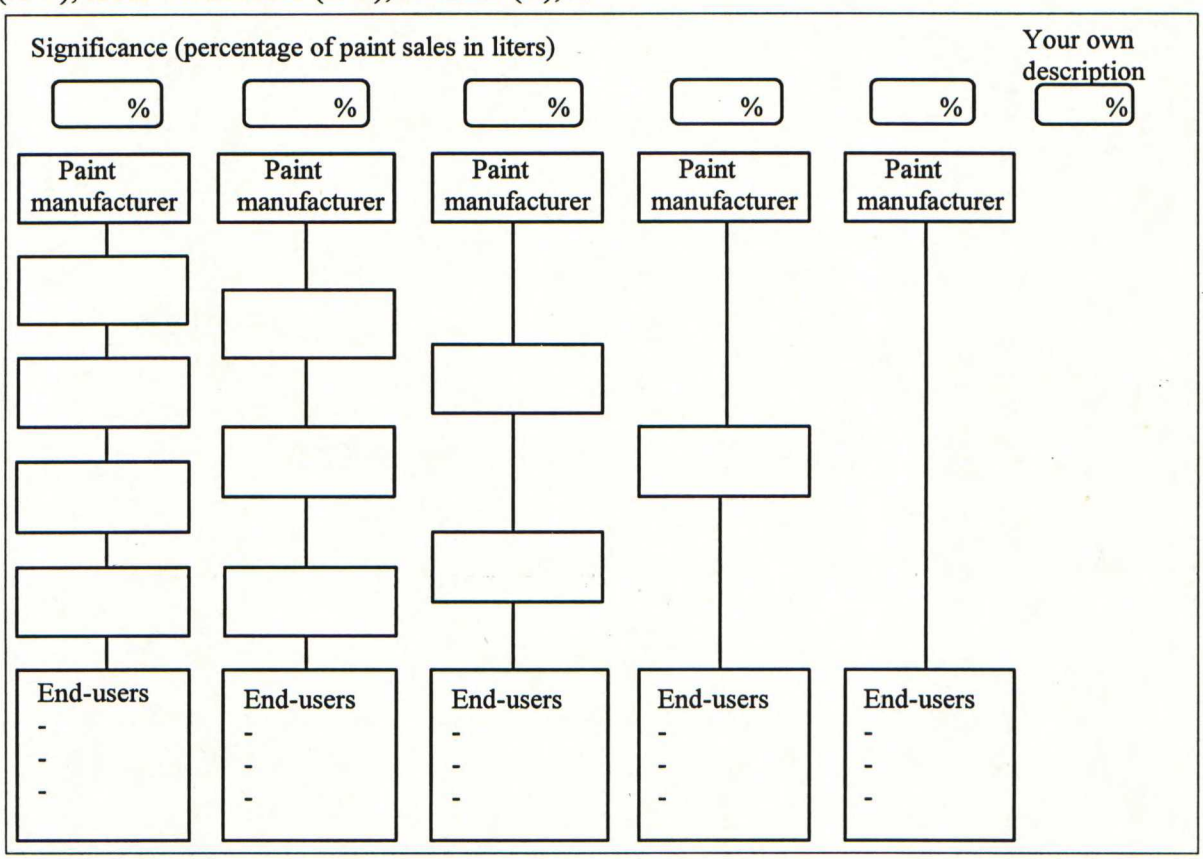



How many retailers belong to retail chains (franchising systems, buying groups, ...)?

| *Number of retailers* | *Sales of retail chains in liters* |
|---|---|
| ¤ 0-25 % of retailers | ¤ 0-25 % |
| ¤ 26-50 % of retailers | ¤ 26-50 % |
| ¤ 51-75% of retailers | ¤ 51-75 % |
| ¤ 76-100% of retailers | ¤ 76-100 % |

## **Physical distribution** (Product flow)

- Please fill the channel members in the boxes: distribution centers (DC), area warehouses (AW), local warehouses (LW), retailers (R), ...




How long are *the delivery times* of coloured paints from the order to the arrival of paints (number of days)?

| | the average | the shortest | the longest |
|---|---|---|---|
| - from a wholesaler to a retailer? | _____ | _____ | _____ |
| - from a manufacturer to a wholesaler? | _____ | _____ | _____ |
| - from a manufacturer to a retailer? | _____ | _____ | _____ |

Are there different stores for do-it-yourself (DIY) customers and for professionals (yes/no)?

_____

Where do the professionals buy the paints?

- from a manufacturer _____
- from a wholesaler _____
- from a retailer _____

Are there... (please choose one of the alternatives)

a) separate deals for every order b) long-standing contracts (e.g. annual)

* between manufacturers and wholesalers? _____
* between wholesalers and retailers? _____
* between manufacturers and retailers? _____

manufacturers own a) 0% b) 1-49% c) 50-100% interest of

* wholesalers? _____
* retailers _____

wholesalers own a) 0% b) 1-49% c) 50-100% interest of

* manufacturers? _____
* retailers? _____

retailers own a) 0% b) 1-49% c) 50-100% interest of

* manufacturers? _____
* wholesalers? _____

Assortment, how many product dimensions can be found in your product range ... ?

- product types_____ - colour shades _____
- matt/gloss levels _____ - standard can sizes _____

- can shape (oval/circular) _____
- can material (plastic/metal/cardboard) _____

Do you use colour cards in paint marketing (yes/no)? _____

How much money do you use in colour marketing as a percentage (%) of sales? ____

| Selling price of the paint (US$/liter) | manufacturer's price | wholesaler's price | retailer's price |
|---|---|---|---|
| - white/indoor | _____ | _____ | _____ |
| - white/outdoor | _____ | _____ | _____ |
| - coloured/indoor | _____ | _____ | _____ |
| - coloured/outdoor | _____ | _____ | _____ |

Selling practices in retail level

- How many percent (%) of paints in liters is sold from stock? _____
- How many percent (%) of paints in liters is delivered only against a specific customer order ? _____
- Are the products that are not stocked by retailer ordered from the wholesaler or from manufacturer (yes/no)? _____
- What is the average *delivery time* from order to arrival of goods (number of days) to the customer in that case? _____

Demand forecasting

- How many colour shades are weekly out-of-stock? _____
- How is demand estimation carried out (methods)? _____

_____

_____

- How many new colour shades is introduced per year? _____
- Do products have a seasonal behaviour? If do, what are the reasons for seasonal behaviour? _____

_____

- Other reasons for demand fluctuations? _____

_____

_____

Legislation - does it restrict distribution decisions? If it does, please explain how? (For instance, are hypermarkets allowed or not?) _____

_____

_____

Do tax regulations favour small retail stores (yes/no)? _____

Tinting systems (=paint mix equipment)

- Do you have a tinting system (yes/no)? _____
- Have you already discussed tinting systems with other channel members? _____

_____

- Which distribution channel members would like to have tinting systems?

_____

_____

- Where would the tinting system most likely be located if it were acquired?

_____

| How are the orders handled between ... | manufacturer-wholesaler | wholesaler-retailer |
|---|---|---|
| - salesmen | _____ | _____ |
| - fax | _____ | _____ |
| - telephone | _____ | _____ |
| - EDI (electronic data interchange) | _____ | _____ |
| - other _____ | _____ | _____ |

How many *liters* of decorative paints (=not industrial paints) do you produce per year?

_____

How many percent (%) of deliveries go... thousand of liters

a) straight to end-users _____ _____
b) straight to retailers _____ _____
c) wholesalers _____ _____

To how many wholesalers do you sell paints? _____

- How many of these are significant (make over 10% of your sales)? _____

Could you estimate the total number of

- paint retailers _____
  trend (growing/decreasing) _____
- paint wholesalers _____
  trend (growing/decreasing) _____

How is paint production of small batches (under 1000 liters) performed now? Do you use any kind of paint mix systems? If do, what kind of paint mix systems do you use? _____

_____

_____

- How long does it normally take to produce small batches from the order to the delivery (number of days)? _____

What kind of problems have you had with

- wholesaler(s)_____

_____

_____

- retailers _____

_____

_____

If you are not satisfied with the present distribution channel structure, what kind of changes are you implementing in the near future? _____

_____

_____

What kind of plans do you have concerning colour marketing? _____

_____

How many *liters* of paint per year have you sold? _____

- What is your market share (%) in paint wholeselling? _____

Do you stock the paints yourself or do you use other ways to provide avalilability to your customers (e.g. cross-docking, consigments, ...)?

_____

From how many manufacturers do you buy the paints? _____

- How many percent (%) of your paint purchases in liters is produced by one manufacturer? _____

To how many retailers do you sell paints? _____

How many percent (%) of your sales goes direct to end-users (=not to retailers)?

_____

What kind of problems have you had with

- manufacturer(s) _____

_____

_____

- retailers _____

_____

_____

What kind of wishes do you have concerning colour marketing? _____

_____

_____

How many *liters* of paint/store/year have you sold? _____

- What are sales of your store compared with other paint stores? (low/medium/high) _____
- Are the sales per store growing or declining (trend)? _____

_____

From how many wholesalers do you buy the paints? _____

- How many of these are significant (make over 20% of your sales)? _____

Direct purchases from paint manufacturer

- From how many manufacturers do you buy the paints? _____

How many percent (%) of your paint sales in liters comes from one manufacturer's products? _____

| How demanding are the customers concerning... | very demanding 1 | 2 | 3 | 4 | not demanding 5 |
|---|---|---|---|---|---|
| - accuracy of colour shades | ¤ | ¤ | ¤ | ¤ | ¤ |
| - number of colour shades | ¤ | ¤ | ¤ | ¤ | ¤ |
| - delivery time (speed) | ¤ | ¤ | ¤ | ¤ | ¤ |
| - delivery accuracy | ¤ | ¤ | ¤ | ¤ | ¤ |

Do you think that customers would be ready to pay more if they got the colour shade that they want? For instance, they could choose from 1000 colour shades and they would get all colours within five minutes. (yes/no) _____

- If yes, how much could the price be increased?

| | | | |
|---|---|---|---|
| 0-10% | _____ | 50-100% | _____ |
| 10-30% | _____ | over 100% | _____ |
| 30-50% | _____ | | |

What kind of problems have you had with

- wholesaler(s) _____

_____

_____

- manufacturer(s) _____

_____

_____

What kind of wishes do you have concerning colour marketing? _____

_____

_____

To how many islands do you have deliveries? _____

What kind of logistics decisions have been made (e.g. seatransport) for islands?

_____

_____

On how many islands do you have own warehouses? _____

What are the delivery times from manufacturer to retailer on islands (number of days)
the average _____ the shortest _____ the longest _____

APPENDIX 8

## Interviewers

| | | |
|---|---|---|
| Japan | Tuomas Söderholm | Trainee (DI), Finnish Exports, Tokyo |
| South-Korea | Young H. Park | Sung Hang New Tech, Seoul, Agent of Tikkurila CPS Oy in Korea |
| Indonesia | Sakari Kuikka | Commercial assistant, Finland Trade Center, Jakarta |
| Malaysia | Susan Chuah | Sales executive, NG BENG TEE SDN BHD, Petaling Jaya, Agent of Tikkurila CPS Oy in Malaysia |
| Philippines | Ramon O. Zulueta | General manager, Filchemie, International Resources Corp., Makati City, Agent of Tikkurila CPS Oy in the Philippines |
| Thailand | Anton Helander | Master of science student, Helsinki School of Economics and Business Administration |

APPENDIX 9

## Results in Country-Level

In this Appendix, the most important country-level issues are discussed in detail.

### A. Channel Structures

The description are mainly based on manufacturers' descriptions because only they have a big picture over the markets. Answers from wholesalers describe how many percents of their sales is direct and how many to retailers. Because the sizes and importances of the case companies varies, the results are not directly concluded. Instead, also the situation in each country has beed considered and estimated.

#### Japan

Share of direct deliveries is very small. The biggest paint manufacturer delivers all paints through its own area warehouses/distribution centers to retailers. However, it is planning to shift partially to direct deliveries to the biggest retailers to shortern the delivery times.

#### Korea

In Korea the large manufacturer is one of the biggest paint manufacturers in Korea. Medium and small companies were also interviewed. Thus, the manufacturers represent all size categories.

| | Through wholes. | Direct to retailers | Direct to users |
|---|---|---|---|
| Large manuf. | 15 | 45 | 40 |
| Med-siz. manuf. | | 70 | 30 |
| Small manuf. | | 50 | 50 |
| *Average* | *5* | *55* | *40* |
| Estimation | 10 | 50 | 40 |

Wholesalers' direct deliveries: 85%, 80%, 90% => average 85%

| | M-W | M-W-R | M-R | M-> |
|---|---|---|---|---|
| Total % | 8 | 2 | 50 | 40 |

**Indonesia**

A large manufacturer was not interviewed in Indonesia. There were some difficulties in Indonesia because many manufacturers were reluctant to cooperate with us in this matter.

| | Through wholes. | Direct to retail. | Direct to users |
|---|---|---|---|
| Med.-siz. manuf. (W) | 25 | 25 | 50 |
| Small manuf. | 60 | 20 | 20 |
| *Average* | *45* | *22,5* | *30* |
| Estimation | 45 | 25 | 30 |

Wholesalers' direct deliveries: 50%, 10%, 25% => 30%

| | M-W | M-W-R | M-R | M-> |
|---|---|---|---|---|
| Total % | 15 | 30 | 35 | 30 |

**Malaysia**

| | Through wholes. | Direct to retailers | Direct to users |
|---|---|---|---|
| Med.-siz. manuf. | 50 | 20 | 30 |
| Small manuf. | 35 | 45 | 20 |
| *Average* | *45* | *30* | *25* |

The wholesaler sells 50% to retailers.

| | M-W | M-W-R | M-R | M-> |
|---|---|---|---|---|
| Total % | 20 | 25 | 30 | 25 |

**Philippines**

In the Phillippines the wholesalers can be divided in two categories: Metro-Manila superdealers and provincial wholesalers.

| | Through wholes. | Direct to retailers | Direct to users |
|---|---|---|---|
| Med-sized. manuf. | 10 | 80 | 10 |
| Med.-sized manuf. | 30 | 50 | 20 |
| Average | 20 | 65 | 15 |

Wholesalers' direct deliveries: 50%

| | M-W | M-W-R | M-R | M-> |
|---|---|---|---|---|
| Total % | 10 | 10 | 65 | 15 |

**Thailand**

This is mainly based on expert's evaluations. This expert has done a market survey in Thailand in 1996.

| | Through wholes. | Direct to retailers | Direct to users |
|---|---|---|---|
| Expert | 50 % (30/20) | 30% | 20% |
| Med.-siz. manuf. | | 20% | 80% |

Only 20 percent of the wholesalers are pure wholesalers. About 30 percent are large retailers/dealers which act wholesalers to small retailers. In Bangkok, some large retailers are called superdealers and there is normally one large retailer and a few small ones in provinces.

Because 30% of wholesalers are mainly large retailers, they may sell the main part to end-users. Based on the general figures in other target countries, if the wholesalers (20%) sell 1/4 and large retailers (30%) 2/3 to end-users, it would make together 25% direct to end-users.

| | M-W | M-W-R | M-R | M-> |
|---|---|---|---|---|
| Total % | 25 | 25 | 30 | 20 |

The case company we had in Thailand is a small medium-sized manufacturer. For this reason, it mainly deliver direct to end-users (80%). It does not use wholesalers at all.

**B. Delivery Times**

| | | M-W | | | W-R | | | M-R | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Aver. | Short | Long | Aver. | Short | Long | Aver. | Short | Long |
| | | | | | | | | | | |
| Japan | **Average** | | | | **4** | **1** | **7** | | | |
| | | | | | | | | | | |
| Korea | | 3 | 2 | 4 | 2 | 1 | 3 | 3 | 1 | 5 |
| | | 6 | 2 | 10 | 2 | 1 | 10 | 5 | 3 | 7 |
| | | 3 | 1 | 5 | 2 | 1 | 7 | 6 | 2 | 10 |
| | | 3 | 1 | 7 | 2 | 1 | 7 | 3 | 2 | 6 |
| | | 3 | 1 | 6 | 1 | 0,5 | 1 | 3 | 2 | 7 |
| | | 3 | 1 | 6 | 3 | 2 | 7 | 4 | 2 | 8 |
| | | 3 | 1 | 7 | 3 | 2 | 7 | | | |
| | | 4 | 1 | 8 | 4 | 2 | 10 | | | |
| | **Average** | **3,5** | **1,2** | **6,6** | **2,4** | **1,2** | **6,5** | **4** | **2** | **7,2** |
| | | | | | | | | | | |
| Indonesia | | 3 | 1 | 14 | 2 | 1 | 7 | 5 | 1 | 14 |
| | | 3 | 1 | 14 | 1 | 0,5 | 2 | 2 | 1 | 7 |
| | | | | | 1 | 1 | 3 | | | |
| | | | | | 2 | 1 | 4 | | | |
| | **Average** | **3** | **1** | **14** | **1,5** | **1** | **4** | **3,5** | **1** | **14** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Malaysia | | 3 | 1 | 14 | 5 | 1 | 14 | 3 | 1 | 14 |
| | | 8 | 3 | 14 | 2 | 1 | 14 | 2 | 1 | 14 |
| | | | 2 | 14 | | 5 | 14 | | | |
| | **Average** | **5,5** | **2** | **14** | **3,5** | **2,3** | **14** | **2,5** | **1** | **14** |
| | | | | | | | | | | |
| Philippines | | 10 | 5 | 21 | 5 | 2 | 10 | 10 | 5 | 21 |
| | | 7 | 3 | 14 | 7 | 3 | 11 | 10 | 7 | 14 |
| | | | | | 7 | 3 | 11 | | | |
| | | | | | 3 | 1 | 14 | | | |
| | **Average** | **8,5** | **4** | **17,5** | **5** | **3** | **12** | **10** | **6** | **18** |
| | | | | | | | | | | |
| Thailand | | 4 | 0,5 | 7 | 0,5 | 0,1 | 1 | 4 | 0,5 | 7 |
| | | | | | | | | 2 | 2 | 5 |
| | **Average** | **4** | **0,5** | **0,5** | **0,5** | **0,1** | **1** | **3** | **1,25** | **6** |
| | | | | | | | | | | |

## C. Importance of manufacturer' paints in distributors' assortment

The table describes two issues. First, importance of coloured in each country is described. Second, the importance of one manufacturer's paints in retailers' and wholesalers' assortment is discussed. These numbers' are based on manufacturers' and the agents' of Tikkurila CPS estimations.

Table: Coloured paints and one manufacturer' shares in assortment

| | Japan | Korea | Indonesia | Malaysia | Philippines | Thailand |
|---|---|---|---|---|---|---|
| Coloured paints (%) | 80% | 30 | 35 | 60 | | N/A |
| Share of one manuf. (%) | 40/90 | 60/80 | 60/50 | 40/40 | - /30 | N/A |

Note! Importance of primers in paint sales is about 20 % (Korea).

## D. Size of Retailers

### Japan

First, the sales were calculated from the official sales of DIY stores in Chapter 5.

| Total sales ($) | Share of paints | paint price ($) | = paint sales in liters | Share of one manufacturer | Share of coloured paints | Sales of one manufacturer's paints |
|---|---|---|---|---|---|---|
| 8 440 000 | 1,5% | 10 | 13 125 | 40% | 80% | 4000 liters |

There sales of two different DIY stores.

| | Sales in liters | | | |
|---|---|---|---|---|
| DIY-retailer A*) | 18 000 | 40% | 80% | 6 000 |
| DIY-retailer B | 415 000 | 40% | 80% | 130 000 |

*) min. sales

**Korea**

Retailers' paint sales

| | Total paint sales | Coloured paints (30%) | One manuf. share (60%) |
|---|---|---|---|
| The average | 15 000 | 4 500 | 2 700 |
| The lowest | 10 000 | 3 000 | 1 800 |
| The highest | 50 000 | 15 000 | 9 000 |

**Indonesia**

Estimations of retailers' sales

| | Manufacturer | Wholesaler A | Wholesaler B | Wholesaler C |
|---|---|---|---|---|
| Average | 24 000 | | 25 000 | 25 000 |
| Lowest | 12 000 | | 2 000 | 10 000 |
| Highest | 35 000 | 55 000 | | 50 000 |

Retailers paint sales

| | Total paint sales | Coloured paints (30%) | One manuf. share (60%) |
|---|---|---|---|
| The average | 15 000 | 4 500 | 2 700 |
| The lowest | 10 000 | 3 000 | 1 800 |
| The highest | 50 000 | 15 000 | 9 000 |

**Malaysia**

In Malaysia only one retailer was interviewed and it was reluctant to announce its annual paint sales. Thus, this study has to rely on sales of interviewed manufacturers to retailers. The average sales to retailers are 2 900 and 3 600 liters.

| | One manuf. sales | Coloured (60%) |
|---|---|---|
| Manuf. A | 2 900 | 1 740 |
| Manuf. B | 3 600 | 2 160 |
| Average | | 2 000 |

**Philippines**

The sales are calculated from two manufacturer's deliveries

| | Total sales | Through retailers*) | Number of retailers | Coloured paints | Coloured paints of one manufacturer |
|---|---|---|---|---|---|
| Manuf. A | 3 500 000 | 85% | 600 | 40% | 2 000 |
| Manuf. B | 12 000 000 | 65% | 3 000 | 40% | 1 000 |

*) Directly or indirectly through wholesalers

**Thailand**

The expert in Thailand evaluated the smallest sales to be about 1 000 liters. The sales of small medium-sized manufacturer per retailer were about 2 000 liters.

## E. Size of Wholesalers

**Japan**

The manufacturer delivered paints through five distribution centers.

| Total sales (liters)/ distribution center | Coloured 80% |
|---|---|
| 1 840000 | 1 500 000 |

**Korea**

| | Total paint sales | Coloured paints (30%) | One manuf. share (80%) |
|---|---|---|---|
| The average | 70 000 | 21 000 | 16 800 |
| The lowest | 36 000 | 10 800 | 8 600 |
| The highest | 204 000 | 61 200 | 49 000 |

**Indonesia**

Estimations of wholesalers' sales

| | Total paint sales | Coloured paints (30%) | One manuf. share (X %) |
|---|---|---|---|
| Wholesaler A | 200 000 | 60 000 | 36 000 (60%) |
| Wholesaler B | 240 000 | 72 000 | 36 000 (50%) |
| Wholesaler C | 480 000 | 144 000 | 57 600 (40%) |

| | Total paint sales | Coloured paints (30%) | One manuf. share (X %) |
|---|---|---|---|
| The average | 300 000 | 90 000 | 36 000 (50%) |
| The lowest | 100 000 | 30 000 | 15 000 (50%) |
| The highest | 480 000 | 144 000 | 58 000 (40%) |

### Malaysia

As in retail side, the numbers are based on manufacturers' estimations.

| | One manuf. sales | Coloured 60% |
|---|---|---|
| Manuf. A | 252 000 | 150 000 |
| Manuf. B | 76 000 | 45 000 |
| Average | | 100 000 |

### Philippines

The sales were received from two manufacturers' deliveries.

| | Total sales | Through wholesalers | Number of wholesalers | Coloured paints | Coloured paints of one manufacturer |
|---|---|---|---|---|---|
| Manuf. A | 3 500 000 | 10% | 5 | 40% | 28 000 |
| Manuf. B | 12 000 000 | 30% | 20 | 40% | 72 000 |

### Thailand

The expert was not able to estimate the average size of wholesalers in Thailand, but the lowest and highest sales were determined. Inside the clauses it is calculated what would be the sales if the of white paints and main manufacturer's sales would be the most typical ones in Asia, 30 and 50 percent.

| | Total sales | Coloured paints (30%) | One manuf. sales (50%) |
|---|---|---|---|
| The average | - | - | - |
| The lowest | 7 000 | (2 100) | (1 000) |
| The highest | 280 000 | (84 000) | (42 000) |

## F. Wholesalers' Direct Sales to End-Users

| | Japan | Korea | Indonesia | Malaysia | Philippines | Thailand |
|---|---|---|---|---|---|---|
| Direct | | 85% | 25% | 50 % | 60 % | |

## G. Assortment - Colour Shades without Tinting Systems

Retailers' assortment

| | Japan | Korea | Indonesia | Malaysia | Philippines | Thailand |
|---|---|---|---|---|---|---|
| Product types | N/A | 4 - 7 | 4 | 16 - 20 | N/A | N/A |
| Gloss levels | N/A | 1 | 2 | 1 | N/A | N/A |
| Colour shades | N/A | 60 - 150 | N/A | 50 | N/A | N/A |
| Can sizes | N/A | 3 | 3 | 4 | N/A | N/A |

Wholesalers' assortment

| | Japan | Korea | Indonesia | Malaysia | Philippines | Thailand |
|---|---|---|---|---|---|---|
| Product types | N/A | 5 - 30 | 3 - 10 | 15 | 6 - 10 | N/A |
| Gloss levels | 2 | 1 | 1 - 2 | N/A | N/A | N/A |
| Colour shades | 125 | 20 - 150 | 16 | N/A | N/A | N/A |
| Can sizes | 6 | 3 | 3 - 4 | 3 | N/A | N/A |

Manufacturers' assortment

| | Japan | Korea | Indonesia | Malaysia | Philippines | Thailand |
|---|---|---|---|---|---|---|
| Product types | N/A | 7 - 80 | 3 | 5 | 8 - 100 | 7 |
| Gloss levels | N/A | 1 - 2 | N/A | 1 | N/A | 1 |
| Colour shades | N/A | (tinting) | N/A | N/A | 120/200 | 50 |
| Can sizes | N/A | 1 - 8 | 3 | 3 | 4 - 6 | 3 |

## H. Assumptions

- Exchange rates used:
  Indonesia: US$ = 10 000 rupiah
  Japan: 1 US = 125 Yen

- 1 liter = 1,3 kg

**APPENDIX 10**

**Assumptions of the Analyses**

| | |
|---|---|
| Cost of colourants per tinted liter: | US$ 0,20 |
| Investment of colour display: | US$ 1000 (Karjala-frame) |
| Cost of colour cards: | US$ 0,15 |

The other factors are given in the text or can be found in the calculations.

| MANUFACT & | ASSEMBLY | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | **Assortment** | Miniplant | Tinting | Traditional | | | |
| | Cans | | 4 | 4 | | | |
| | Product types | | 10 | 10 | | | |
| | Shades/bases | | 3 | 30 | | | |
| | Gloss levels | | 1 | 1 | | | |
| | Total | 15 | 120 | 1200 | | | |
| | | | | | | | |
| | **Complexity** | | square root | | | | |
| | Trad. vs tint. | 10,00 | 3,16 | | | | |
| | Trad. vs miniplant | 80,00 | 8,94 | | | | |
| | Tint. vs miniplant | 8,00 | 2,83 | | | | |
| | | | | | | | |
| | | | | | | | |
| | | **MINIPLANT** | **AUTOM.** | | | **MINIPLANT** | **AUTOM.*)** |
| **Warehouse** | Sales (coloured) | 400000,00 | 400000,00 | | Investment costs | 37502,4 | 19953,2 |
| | Stocks (2 months) | 0,17 | 0,17 | | Inventory reduct. | 13322,949 | 10256,584 |
| | Stock level (liters) | 66666,67 | 66666,67 | | **Total** | **-24179,451** | **-9696,616** |
| | New stock level | 7453,56 | 21081,85 | | | | |
| | Drop in inventories | 59213,11 | 45584,82 | | | | |
| | Paint price (US$) | 1,50 | 1,50 | | *) machine with | | |
| | Value of reductions | 88819,66 | 68377,22 | | can transport | | |
| | Interest rate p.a. | 0,15 | 0,15 | | | | |
| | **Savings (US$)** | **13322,95** | **10256,58** | | | | |
| | | | | | | | |
| | | | | | | **MINIPLANT** | **AUTOM.** |
| **Manufacturer** | Sales (coloured) | 400000,00 | 400000,00 | | Inventory reduct. | 13322,949 | 10256,584 |
| | Stocks (2 months) | 0,17 | 0,17 | | **Total** | **13322,949** | **10256,584** |
| | Stock level (liters) | 66666,67 | 66666,67 | | | | |
| | New stock level | 7453,56 | 21081,85 | | | | |
| | drop in inventories | 59213,11 | 45584,82 | | | | |
| | paint price (US$) | 1,50 | 1,50 | | | | |
| | value of reductions | 88819,66 | 68377,22 | | | | |
| | Interest rate p.a. | 0,15 | 0,15 | | | | |
| | **Savings (US$)** | **13322,95** | **10256,58** | | | | |
| | | | | | **TOTAL** | **-10856,502** | **559,96702** |
| | | | | | | | |

| MANUFACT & | ASSEMBLY | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| | **Assortment** | Miniplant | Tinting | Traditional | | | | | | | | | | |
| | Cans | | 4 | 4 | | | | | | | | | | |
| | Product types | | 10 | 10 | | | | | | | | | | |
| | Shades/bases | | 3 | 30 | | | | | | | | | | |
| | Gloss levels | | 1 | 1 | | | | | | | | | | |
| | Total | 15 | 120 | 1200 | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | **Complexity** | | square root | | | | | | | | | | | |
| | Trad. vs tint. | 10,00 | 3,16 | | | | | | | | | | | |
| | Trad. vs miniplant | 80,00 | 8,94 | | | | | | | | | | | |
| | Tint. vs miniplant | 8,00 | 2,83 | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | **MINIPLANT** | | | | | | | | **AUTOM.** | | | |
| **Warehouse 1** | Sales (coloured) | 400000,00 | | **Performance** | | | | Sales (coloured) | 400000,00 | | **Performance** | | | |
| | Stocks (2 months) | 0,17 | | Miniplant | 0.2404 | 37502,40 | | Stocks (2 months) | 0,17 | | Autom. machine* | 0.2404 | 19953,20 | |
| | Stock level (liters) | 66666,67 | | Col. display (-) | | 240,40 | | Stock level (liters) | 66666,67 | | Col. display (-) | | 240,40 | |
| | New stock level | 7453,56 | | Colourants (-) | | 80000,00 | | New stock level | 21081,85 | | Colourants (-) | | 80000,00 | |
| | Drop in inventories | 59213,11 | | Inventories (+) | | 13322,95 | | Drop in inventories | 45584,82 | | Inventories (+) | | 10256,58 | |
| | Paint price (US$) | 1,50 | | Price % (+) | 0,15 | 120000,00 | | Paint price (US$) | 1,50 | | Price % (+) | 0,15 | 120000,00 | |
| | Value of reductions | 88819,66 | | **Total** | | **15580,15** | | Value of reductions | 68377,22 | | **Total** | | **30062,98** | |
| | Interest rate p.a. | 0,15 | | | | | | Interest rate p.a. | 0,15 | | | | | |
| | **Savings (US$)** | **13322,95** | | | | | | **Savings (US$)** | **10256,58** | | *) with can transport | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Manufacturer** | Sales (coloured) | 400000,00 | | **Performance** | | | | Sales (coloured) | 400000,00 | | **Performance** | | | |
| | Stocks (2 months) | 0,17 | | Inventories (+) | | 13322,95 | | Stocks (1 month) | 0,17 | | Inventories (+) | | 10256,58 | |
| | Stock level (liters) | 66666,67 | | **Total** | | **13322,95** | | Stock level (liters) | 66666,67 | | **Total** | | **10256,58** | |
| | New stock level | 7453,56 | | | | | | New stock level | 21081,85 | | | | | |
| | drop in inventories | 59213,11 | | | | | | drop in inventories | 45584,82 | | | | | |
| | paint price (US$) | 1,50 | | | | | | paint price (US$) | 1,50 | | | | | |
| | value of reductions | 88819,66 | | | | | | value of reductions | 68377,22 | | | | | |
| | Interest rate p.a. | 0,15 | | | | | | Interest rate p.a. | 0,15 | | | | | |
| | **Savings (US$)** | **13322,95** | | **TOTAL** | | **28903,10** | | **Savings (US$)** | **10256,58** | | **TOTAL** | | **40319,57** | |

| MANUAL & Tinting | AUTOMATIC Assortment | Miniplant | Tinting | Traditional |
|---|---|---|---|---|
| | Cans | | 4 | 4 |
| | Product types | | 8 | 8 |
| | Shades/bases | | 3 | 20 |
| | Gloss levels | | 1 | 1 |
| | Total | 15 | 96 | 640 |
| | | | | |
| | **Complexity** | | square root | |
| | Trad. vs tint. | 6,67 | 2,58 | |
| | Trad. vs miniplant | 42,67 | 6,53 | |
| | Tint. vs miniplant | 6,40 | 2,53 | |

| | | | | | **Manual** | | | **Simple** | | | **Autom.** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Retailers** | Sales (coloured) | 10000,00 | | Manual (-) | 0,24 | 1322,20 | Simple (-) | 0,2404 | 2163,60 | Autom. (-) | 0,24 | 3245,40 |
| | Stocks (2 months) | 0,17 | | Col. display (-) | 0,24 | 240,00 | Col. display (-) | | 240,00 | Col. display (-) | | 240,00 |
| | Stock level (liters) | 1666,67 | | Colourants $(-) | | 2000,00 | Colourants $(-) | | 2000,00 | Colourants $(-) | | 2000,00 |
| | New stock level | 645,50 | | Inventories (+) | | 325,50 | Inventories (+) | | 325,50 | Inventories (+) | | 325,50 |
| | Drop in inventories | 1021,17 | | Price % (+) | 0,60 | 12750,00 | Price % (+) | 0,60 | 12750,00 | Price % (+) | 0,60 | 12750,00 |
| | Paint price (US$) | 2,13 | | Extra cost | 0,1 | 500 | **Total** | | **8671,90** | **Total** | | **7590,10** |
| | Value of reductions | 2169,99 | | **Total** | | **9013,30** | | | | | | |
| | Interest rate p.a. | 0,15 | | | | | | | | | | |
| | **Savings (US$)** | **325,50** | | | | | | | | | | |

sales of 5'

| | Manual | Simple | Autom. |
|---|---|---|---|
| '0% | -2,577 | -3,169 | -4,251 |
| 10% | -1,515 | -2,106 | -3,189 |
| 20% | -0,452 | -1,044 | -2,126 |
| 30% | 0,609 | 0,018 | -1,063 |
| 40% | 1,672 | 1,081 | -0,001 |
| 50% | 2,735 | 2,143 | 1,061 |
| 60% | 3,725 | 3,134 | 2,052 |
| 70% | 4,788 | 4,197 | 3,115 |

sales of 10'

| | Manual | Simple | Autom. |
|---|---|---|---|
| 0% | -3,737 | -4,078 | -5,16 |
| 10% | -1,612 | -1,953 | -3,035 |
| 20% | 0,513 | 0,172 | -0,909 |
| '30% | 2,638 | 2,297 | 1,215 |
| 40% | 4,763 | 4,422 | 3,34 |
| 50% | 6,888 | 6,547 | 5,465 |
| 60% | 9,013 | 8,672 | 7,59 |
| 70% | 11,138 | 10,796 | 9,715 |

sales of 3'

| | Manual | Manual | Simple | Autom. |
|---|---|---|---|---|
| 0% | -2,065 | -2,214 | -2,906 | -3,987 |
| 10% | -1,427 | -1,577 | -2,268 | -3,35 |
| 20% | -0,78 | -0,94 | -1,63 | -2,713 |
| 30% | -0,152 | -0,302 | -0,993 | -2,075 |
| 40% | 0,485 | 0,335 | -0,356 | -1,438 |
| 50% | -1,123 | 0,973 | 0,281 | -0,8 |
| 60% | 1,76 | 1,61 | 0,919 | -0,162 |
| 70% | 2,398 | 2,248 | 1,557 | 0,475 |

| LEVELS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tinting | **Assortment** | Miniplant | Tinting | Traditional | | | | | | | |
| | Cans | | 3 | 3 | | | | | | | |
| | Product types | | 10 | 10 | | | | | | | |
| | Shades/bases | | 3 | 20 | | | | | | | |
| | Gloss levels | | 2 | 2 | | | | | | | |
| | Total | 15 | 180 | 1200 | | | | | | | |
| | | | | | | | | | | **Thousand** | |
| | **Complexity** | | square root | | | | | | | **US$** | |
| | Trad. vs tint. | 6,67 | 2,58 | | | | | | | Retail | Wholesale |
| | Trad. vs miniplant | 80,00 | 8,94 | | | | | | 0% | -2,328 | -8,332 |
| | Tint. vs miniplant | 12,00 | 3,46 | | | | | | 5% | -1,797 | -4,69 |
| | | | | **Tinting by** | | | | | 10% | -1,265 | -1,049 |
| | | | Phase 2 | **retailer** | | | | | 15% | -0,734 | 2,592 |
| **Retailers** | Sales (coloured) | 5000,00 | | Manual (-) | 0,24 | 1322,20 | | | 20% | -0,203 | 6,233 |
| | Stocks (2 months) | 0,17 | | Col. display (-) | | 240,40 | | | 25% | 0,328 | 9,874 |
| | Stock level (liters) | 1200,00 | | Colourants $(-) | | 1000,00 | | | 30% | 0,859 | 13,515 |
| | New stock level | 464,76 | | Inventories (+) | | 234,36 | | | | | |
| | Drop in inventories | 735,24 | | Price % (+) | 0,30 | 3187,50 | | | | | |
| | Paint price (US$) | 2,13 | | **Total** | | **859,26** | | | | | |
| | Value of reductions | 1562,39 | | | | | | | | | |
| | Interest rate p.a. | 0,15 | | | | | | | | | |
| | **Savings (US$)** | **234,36** | | | | | | | | | |
| | | | | **Tinting by** | | | | | | | |
| | | | Phase 1 | **wholesaler** | | | | | | | |
| **Wholesaler** | Sales (coloured) | 35000,00 | | Total sales | | 35000 | | | | | |
| | Stocks (2 months) | 0,17 | | Direct sales | | 10000,00 | | | | | |
| | Stock level (liters) | 5833,33 | | Simple autom. | | | 2163,6 | | | | |
| | New stock level | 2259,24 | | Col. display (-) | | | 240,40 | | | | |
| | Drop in inventories | 3574,09 | | Colourants (-) | | | 7000,00 | | | | |
| | Paint price (US$) | 2,00 | | Inventories (+) | | | 1072,23 | | | | |
| | Value of reductions | 7148,19 | | Price % (+) | 0,30 | | 21847,50 | | | | |
| | Interest rate p.a. | 0,15 | | **Total** | | | **13515,73** | | | | |
| | **Savings (US$)** | **1072,23** | | | | | | | | | |